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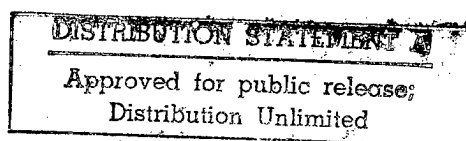
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Science & Technology

Central Eurasia: Science & Technology Policy

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Central Eurasia: Science & Technology Policy

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[Abridged text of speech of President of the Russian Academy of Sciences Academician Yu.S. Osipov at the General Meeting of the Russian Academy of Sciences on 22 December 1992, under the rubric "What Is Science To Be Like?": "The Russian Academic Science: The State and Prospects"]

[Text] The year 1992 was a difficult period in the history of our country. This was a year of hopes and disappointments, reforms, construction and destruction, the most acute economic crisis, and the impoverishment of the people. We went through a political crisis, when the country, by the admission of the president, was on the verge of disaster. The year 1992 could also not but be extremely difficult for the Russian Academy of Sciences. And it is not a matter of the failure of anyone to understand the role of basic science in society. Many customary buttresses of the academy were destroyed or substantially deformed, customary ties were broken, the levers of management, which were standard for many years, practically disappeared. We, having great inertia, worked under the conditions of the crisis, hard to predict circumstances, and a shortage of resources.

The academy did not collapse, and this is the main result. It sustained losses, but held out with the support of the state and owing to your and my common efforts. It did not collapse as the highest scientific institution of Russia, as the main source of basic knowledge. The academy owing to the devotion of scientists to their cause is retaining a high potential and prestige in the world scientific community. Its contribution to world science remains very significant, in a number of directions it is decisive.

And this should be particularly emphasized today, since the numerous discussions about the crisis of our finances, about the dire straits of scientists, and about the decline of the prestige of science in the country—discussions which were often conducted in an abstract and superficial manner, in isolation from an understanding of how the entire country is living at this time—produced in social consciousness the notion of a profound scientific crisis and of the collapse of domestic science.

Allow me to acquaint you with some data on the state of our research.

At the Special Astrophysical Observatory two unique facilities are operating: the RATAN-600 (radio astronomical telescope of the Academy of Sciences with a diameter of 600 meters) and the largest optical telescope in the world, the BTA (large azimuthal telescope), with a one-piece main mirror 6 meters in diameter.

The most important achievement here was the completion of the first stage of the international program "The Big Trio," in which there are being used: the RATAN-600 as a unique research tool, the VLA (Very Large

Array) in the United States as the best tool in the world for the obtaining of radio images, and the BTA as one of the best optical telescopes for the identification of new radio sources, which have been detected on the RATAN-600, with optically visible objects. At the first stage of the research, a reference selection of the most remote stellar systems, which appeared during the first 1 billion years after the origination of the universe, was made. A list of reference objects has now been transmitted to observers from the ROSAT satellite for their study in the soft X-ray band. Direct data on the curvature of space at the early stages of the evolution of the universe, that is, on the basic characteristic of the geometry of the world, will be the final result.

The work at another unique facility—the Moscow Meson-Producing Cyclotron—is continuing, although not as rapidly as would be liked. The main achievement here is the obtaining of a beam of protons with an energy of 250 million electron volts. The maximum achieved beam current in a pulse came to 12 microamperes. It was possible to prepare the equipment of the fourth sector of the accelerator for the further increase of the energy of particles.

Vigorous efforts were made on the enlistment of foreign participants in the completion of the construction of the unique PIK research nuclear reactor (Gatchina) and on the establishment on its basis of an international neutron research center. The first discussion and analysis of the prospects are planned for January.

Mathematicians and theoretical physicists of the RAS [Russian Academy of Sciences] as before hold leading positions in the world. In recent years international cooperation in these fields has expanded significantly. The International Mathematical Institute imeni Euler was opened in St. Petersburg.

The practical lack in 1992 of assets for the purchase of advanced scientific equipment had an extremely strong effect on the situation in experimental physics. In many cases new basic results of a world level in semiconductor and low-temperature physics, optics, and others were obtained as a result of the participation of our experimenters in joint projects with western scientists, which afforded them the opportunity to use the equipment of western laboratories.

At the request of the government of the Russian Federation the institutes of the Physical and Technical Problems of Power Engineering Department took part in the formulation of the concept of the energy policy of Russia under the new economic conditions. The provision on the temporary (20-25 years) priority use in the power industry of natural gas, according to which the shortage of electric power and heat should be offset by the extensive use of combined steam-gas plants, which are built instead of traditional heat and electric power plants and boiler plants, is one of the main features of the concept.

In the area of computer technology a large amount of work on the development of new generations of domestic supercomputers was performed on the basis of the ideas

of parallel computing, the use of nontraditional architectures, and new physical principles of the construction of the component base. Our Academy of Sciences is experiencing an urgent need for them in connection with the fulfillment of the programs on space, nuclear power engineering, and others.

In the area of new high technologies of the development of the component base of computer technology a project of the development of alternative semiconductor metallic nanoelectronics is being implemented. During the implementation of this project various model and instrumental nanoelectronic structures, including single-electron quantum-interference structures, were produced and the effects of electronic phase memory, which lead to the superconductivity of normal metals, were discovered.

A theory and numerical methods of the calculation of the unsteady motions of a viscoelastic liquid in long pipes, which made it possible to establish the possibility of the appreciable decrease of energy losses in case of periodic modes of the pumping of such liquids, particularly petroleum, were developed.

The principles of the construction and mechanisms of the automatic generation of large knowledge bases, which summarize the experience of the operation of complex technical objects, were developed. As a result the time of the development of diagnostic systems and systems of the guarantee of the safety and viability of such objects is being shortened by many fold (by twenty- to thirty-fold).

In spite of the complicated situation and many difficulties, during 1992 world-level results were obtained at chemical institutes of the RAS. Thus, at the Institute of Chemical Physics the development of a unique unit was completed and experimental studies of processes with the detection of measurements of interatomic distances in 10^{-13} - 10^{-14} second were begun.

In the area of chemical material science a unique steel with a strength of 2,800 megapascals with an exceptionally high ductility and toughness, which in the sum of these and other properties surpasses all the steel grades known in the world, was developed on the basis of basic studies of the role of the alloying of metals.

Modern chemistry requires not only a complex and diverse instrument and technical base, but also supply with chemical reagents and materials. And whereas we succeeded this year in settling the question of the free supply of chemical institutes and the central libraries of the RAS with the basic foreign chemical journals, the excessively high operating expenses, particularly with respect to energy resources and water, and the collapse of the system of material and technical supply are actually paralyzing the activity of chemical institutes.

Moreover, the rapid disintegration, physical deterioration, and obsolescence of our instrument base are occurring. This is depriving us of the opportunity to conduct experimental work at a modern level.

The RAS's own scientific instrument making in connection with the elimination of academy-wide programs in the area of instrument making and with the lack of special-purpose assets for them does not have real opportunities either to develop and produce advanced scientific instruments and devices or even to implement them within the academy.

The loss by Russia of a number of mining and oil-producing regions brought about the need for the scientifically substantiated revision of the structure of the mineral raw material base of the country. In connection with this the attention of scientists was focused, first, on the identification of new mining areas and the reevaluation of the potential of existing ones (for example, the Kursk Magnetic Anomaly) and, second, on the problems of the use of nontraditional sources of mineral raw materials—such as, for example, technogenic sources. The substantiation of the promise and advisability of the development of the gas and oil field in Krasnoyarsk Kray with oil reserves of 1 billion to 2.8 billion tons is a most important contribution.

The sharp decrease of all forms of expedition work is causing serious concern. The decrease of the influx of experimental material, which is attributable to this, is equivalent to the curtailment of work in a number of scientific directions. The lack of the assets needed for the maintenance of the deep-sea vessels of the RAS and for their proper use led to the sharp decrease of maritime expeditionary activity of the RAS in 1992. Thus, the total duration of the cruises of deep-sea vessels for scientific purposes came this year as compared with 1990 to not more than 25-30 percent.

In speaking about the state of research in the life sciences, one should first of all note the substantial progress in the development of the present stage of biotechnology. It is a matter of bioengineering in the area of microbe, animal, and plant objects. The development of a biotechnology of the future—the cell-free synthesis of protein—leads the world level.

A new institute established by the academy—the Institute of Gene Biology—has begun work, the new state scientific and technical program "Priority Directions of Genetics" has been adopted and has begun to be financed. This and three other state biological programs have been combined in the Russian priority "The Life Sciences and Biotechnology."

During the past year we dealt a great deal with the state of affairs in the social sciences and the humanities. For a long time in our country these sciences were called social sciences. Their definition as the social sciences and the humanities is not a formal change of the name. It is a matter, first, of the terminology adopted throughout the world and, second, of the significant reorientation of these sciences.

The too close interaction of the social sciences and politics without the keeping of a certain distance and the

too strong "engagement" of scientists in the administration of the state can again make of social scientists the "perpetrators" of civil disorders and crisis upheavals. Incidentally, this "engagement" also has its positive aspects. Nevertheless, it is the task of the academy to secure for scientists and scientific collectives the conditions and opportunities to "follow" social phenomena and to present their own, at times inevitably most different, opinions and versions, while it is the job of politicians to choose and consider these recommendations in the context of the other factors that constitute the process of making decisions and implementing them.

The priority directions of research have now been specified in all the humanities departments. The development of the concept of the national revival of Russia holds the central place in these directions. The efforts of economists and lawyers, sociologists and philosophers, historians, political scientists, literary scholars, and linguists are being aimed namely at the study of the different components, directions, and forms of the national revival of Russia.

Among the priority themes, which have been approved by the presidium, are the elaboration of a model of economic development, market relations, and the role of the state in economic development and the determination of social priorities.

Society is waiting for in-depth studies of the spiritual development of Russia and its contribution of the development of world culture. With our ideas and suggestions we should formulate models of the social development of Russia, which are coincident with reality, and promote the writing of modern legislation, the development of the social and political system, the preservation and development of culture, and the revival of spiritual values.

In 1992 the Russian Academy of Sciences succeeded in maintaining the breadth of the front of research in the majority of scientific directions and in keeping research at a sufficiently high level. Here it was possible to preserve the most important element—the ability of our scientists and their collectives to join quickly in the study of new scientific problems.

Under what conditions did our work take place? The deep crisis in the country was naturally projected on the life of the academy, creating quite unusual problems of domestic basic science. We should speak in greater detail about several of these problems.

Fundamental changes in the financing of science occurred. It is a matter of the impoverishment of science and our academy. This began even earlier—in 1990—but the real collapse occurred this year.

The most difficult economic conditions, under which Russia found itself, could not but affect the level of financial support of the institutions of the RAS, many of which, particularly during the fourth quarter, were in an extremely difficult position. The rate of inflation is much higher than was predicted at the end of 1991, when the budget of the

academy for 1992 was formed, and substantially outstripped the increase of the funds being allocated to it. Moreover, the assets were allocated monthly, as a rule, with a big delay, which complicated even more the financial and economic activity of our institutions.

As a whole the amount of base financing of the Russian Academy of Sciences from the state budget came together with the regional departments to 12.7 billion rubles [R]. Institutions of the academy received about R4.5 billion more through state scientific and technical programs, from the reserve of the Ministry of Science, the Higher School, and Technical Policy, and from other budget sources. However, simple calculations show that, even by taking the most modest conversion factors and taking into account only the official, centralized increases of the wage, the amount of financing in comparable prices decreased this year as compared with 1990 by a factor of approximately 2.5.

For institutions of the academy the expenditures on heat and electric power, water, and the leasing and guarding of buildings and other expenses of a mandatory nature, without which the very functioning of institutions, the maintenance of housing and institutions of the social sphere, and the upkeep of the infrastructure of academic campuses are impossible, became the most serious problem this year. Taking into account that the wage together with the charges for social insurance makes up about 60 percent of the total expenditures of our institutions, crumbs, which do not make it possible to carry out serious scientific programs, remain for all the other needs which are directly connected with the conducting of research—materials, reagents, scientific instruments and equipment, and expeditions.

A particularly urgent situation developed at the academy during the fourth quarter when, in connection with the next wage increase by 1.5-fold and the jump in prices for energy resources, the academy budget deficit approached R1 billion. Additional financing in the amount of R1.7 billion was allotted to the academy only as a result of our appeals directly to the president of Russia and to the chairman of the government. This, without exaggeration, saved the academy from financial collapse.

The deterioration of the economic situation of institutions and organizations of the RAS appeared to the greatest degree this year in their supply with instruments, materials, and scientific literature, which are purchased abroad. Given the total need of the academy just with respect to foreign scientific literature, of \$25 million only \$3 million was received for these purposes.

After repeated appeals to the government of the Russian Federation \$500,000 were allocated for the payment of dues to international scientific organizations and foreign expeditions (in 1990 about \$14 million was spent on this).

In 1992 the process of the "brain drain" increased at the academy. The beginning of the process is visible back in 1988, when our society embarked on the path of openness. In fact the decrease of the number of personnel of

the academy came during the last six months to 9.8 percent. The departure from scientific institutions of a significant number of associates, particularly young people, threatens our science with catastrophic consequences. It is a matter of the undermining of the intellectual potential of the country, while this as a result can deprive our country of a future and reduce it to the role of a second-rate power.

The problem of the decrease of the influx of young people to scientific institutions of the RAS is causing anxiety. Whereas in 1989 this influx came to more than 3,500 young specialists with a higher and secondary specialized education, in 1991 this figure decreased to 2,000, while this year it came to a little more than 1,000.

In speaking about the problem of scientific personnel and the "brain drain," we should not forget that the loss of the technical potential, which is modest as it is and supplies researchers with domestic instruments, materials, and reagents, can have no less dramatic consequences for science. As a whole the correct orientation toward researchers (even those who are not in charge of structural departments and directors) disposing of material resources in the form of grants is now resulting in the fact that researchers often try to "pump" the received money entirely into the wage. This entails a minimum of two negative consequences. First, without considering on what equipment and on what materials the financed research will be conducted, scientists are undermining the foundation of the successful fulfillment of their assumed obligations. Second, the few enterprises, which produce instruments, materials, and reagents, being deprived of orders, are beginning to seek spasmodically means of changing their specialization for the purpose of putting out products that are in great demand.

Our publishing is experiencing a crisis. Under the mark of the Nauka Publishing House during the first quarter of 1992 two-fifths as many books were published as during the corresponding period of 1991 and close to one-fourth as many were published as in 1988. There has not been such a thing in the entire history of the academic publishing house. The academy was faced with the need to obtain many millions of rubles in subsidies for offsetting the losses from the publication of books and journals.

Along with objective reasons (the increase of prices for materials and services, the decrease of the purchasing power of the population, the decline of the number of printed copies of books and journals) the critical state of affairs with the publication of scientific literature in many respects was explained by serious shortcomings in the activity of the former management of the Nauka Publishing House. The leadership of the Academy of Sciences was forced to set up a special commission for the analysis of the situation which had formed at the Nauka Publishing House. The results of the work of the commission were examined at a meeting of the presidium of the RAS.

By a directive of the presidium the management of the Nauka Publishing House was replaced. In the decision of the presidium of 13 May of this year, "On the Publishing Activity of the Russian Academy of Sciences," there were formulated the principles of the reorganization of the Nauka Publishing and Production Complex, on the basis of which the All-Russian Nauka Association of Publishing, Printing, and Book Trade Enterprises (the Nauka VO) was established. The new management, which was confronted with an enormous list of hard to solve problems, is seeking means of recovering from the crisis. Much has already been done. The stress level with the publication of journals is declining. The publication of books is being purposefully restored: During the fourth quarter of this year at the Nauka Publishing House alone threefold more books will be published than during the first quarter (220 titles as against 77). Contacts are being established with academic institutes. Debts are being paid off. The situation in the collective is stabilizing. Skilled accounting personnel have been selected. The work of the printing plants is being reorganized. In short, the turning of the publishing house to face the academy is occurring.

The presidium of the RAS in accordance with the results of the work of the authoritative commission adopted on 30 June of this year the decree "On the Reorganization of Publishing at the Russian Academy of Sciences and the Establishment of the Nauka International Academic Publishing Company." The basic goal of this decision is by means of the revenues of the international publishing house from the translation and publication of academic journals in English to ensure the financing of the publication of scientific works and all Russian-language versions of journals (and not only the ones which are translated) and to modernize the backward publishing and printing base of the academy. The registration of the company is now being prepared.

A difficult situation has formed in the area of international scientific ties.

Our basic efforts had the aim under the conditions of the acute budget deficit and the lack of currency financing to retain our foreign ties, as well as to mobilize the international scientific community for the purposes of preserving and developing basic science in the country. In 1992 new agreements were signed with the U.S. National Academy of Sciences, the National Center for Scientific Research of France, the London Royal Society, the Accademia de Lincea (Italy), the Korean Science and Technology Fund, and scientific organizations of China.

At present the academy has about 80 agreements with foreign academies and scientific centers and is participating in the fulfillment of more than 30 interstate contracts. Its institutes are conducting research within the framework of 350 protocols on the basis of direct ties. Moreover, the RAS, its institutions, and individual scientists are members of 235 international organizations.

Scientists of the RAS succeeded in taking part in the most important scientific forums of the passing year, such as the International Congress on Theoretical and Applied Mechanics (Israel); the World Congress on Space (the United States); the International Geology Congress (Japan); the International Geography Congress (the United States); the International Congress on Liquid Crystals (Italy), and a number of others.

The formation and expansion of ties of the RAS with international intergovernmental organizations: the United Nations, UNESCO, the United Nations Environment Programme, the International Atomic Energy Agency, the United Nations Industrial Development Organization, and WHO, occurred. In March 1992 as a result of talks the Memorandum on Scientific Cooperation Between the Russian Academy of Sciences and UNESCO, which in the future envisages a wide range of joint scientific research projects in the area of basic science, was signed.

In February 1992 the first contacts of the RAS with NATO were established. During the conference on questions of cooperation between the science committee of NATO and the countries of Eastern Europe, which was held in Brussels, representatives of the academy submitted to the leadership of the science committee of NATO a package of specific proposals on our cooperation, which were prepared by institutes of the RAS.

During the passing year the Association for the Establishment of the International Foundation of the RAS, which should coordinate the efforts of the foreign community on giving assistance in the preservation and development of the basic research being conducted by the RAS, was established and was given organizational form. With the help of our embassies the proposals of the RAS on the conducting of joint research and development were sent to all the most prominent foreign centers and foundations.

The ties with the academies of sciences of the countries of the neighboring foreign regions became a new problem for us. In many scientific directions our ties with them were actually severed, they remained in tact only at the level of individual institutes and scientists. And only recently did reassuring elements appear.

The ties between the Russian Academy and the academies of sciences of the republics of the former Union have again begun to become stronger. Contracts on cooperation of the Russian Academy of Sciences with the majority of academies of the countries of the CIS, in which it is stipulated that all the scientific facilities and social facilities, which have been established jointly on the territory of the Russian Federation and another country, are the joint property of both academies and their operation is specified by a special agreement, have now been concluded. The form of joint ownership should not be at variance with "The Law on Property" of the Russian Federation and the other country.

Capital construction and the infrastructure of the academy fully experienced the financial and economic difficulties of the country. Everyone knows the situation with our hospital and polyclinic and the catastrophic situation with the construction of the hospital complex in Uzkoeye. Our medical institutions are experiencing a shortage of drugs and medical equipment. The wage of physicians and medical personnel at Moscow academic medical institutions is lower than the citywide level. Children's institutions and the House for Veterans of Science are in a difficult position.

As compared with 1991 the cost of construction increased by forty-five to fiftyfold and more, which led to the decrease of work at construction projects, the dragging out of their placement into operation, and the significant increase of the amounts of unfinished construction.

The situation with the **legislative and standards activity of state structures** is affecting the fate of the academy and its activity.

In the past year many different important and useful edicts, laws, and decrees were adopted. But many of them are not being fulfilled and are stuck in the bureaucratic corridors of power.

As is known, it was specified by Edict No. 228 of the president of the RSFSR of 21 November 1991, "On the Organization of the Russian Academy of Sciences," that the RAS is the highest scientific institution of Russia and "an all-Russia self-administered organization which operates on the basis of the legislation of the RSFSR and its own charter."

The concept "all-Russian self-administered organization," which was introduced by the edict of the president of the RSFSR with respect to the RAS, has not been disclosed; it is today a purely declarative assertion. Legislative acts on this issue have not yet been passed.

As it seems to me, a significant portion of the members of the academy are of the opinion that the status of a self-administered state organization, to whose complete economic disposal all the property, which it now possesses, is transferred, suits the academy most of all.

The edict of the president of the Russian Federation of 27 April 1992, "On Urgent Steps on the Preservation of the Scientific and Technical Potential of the Russian Federation," in accordance with which the Russian Basic Research Foundation, of which Vice President of the RAS Academician A.A. Gonchar was appointed chairman, was established, is of great importance for the creation of conditions that ensure the preservation of the scientific and technical potential of Russia, including the scientific potential of the academy. The charter of the foundation was approved by the decree of the government of the Russian Federation of 3 November of this year, "On the Russian Basic Research Foundation."

The academy took active steps on making changes in the prevailing tax legislation, as a result of which our proposals were for the most part taken into account when inserting addenda in the corresponding laws. Thus, for example, there was inserted in the RSFSR law "On the Tax on the Property of Enterprises" an addendum, according to which the property of scientific research institutions, enterprises, and organizations of the Russian Academy of Sciences is not assessed this tax.

The legal protection of the use of the results of scientific research and scientific development and intellectual property is a very important problem. The provisions of the package of laws on intellectual property of the Russian Federation are of fundamental importance for the sphere of intellectual activity, including for the activity of the Russian Academy of Sciences.

But the difficulties are being aggravated by the lack to this day of a number of basic laws in the area of scientific activity, such as the laws "On Scientific and Technical Policy," "On the Scientific (Nonprofit) Organization," "On the Status of the Scientific Worker," and others.

The interaction of academic and VUZ science has an exceptionally important role for the high level of science in Russia.

Institutes and scientific centers of the academy already have positive experience of interaction with the higher school; it is possible to name the educational scientific associations on the basis of the Ural Department of the RAS and the Ural State University, the Siberian Department of the RAS, and Novosibirsk State University. We should change over to fundamentally new forms of the interrelation with higher educational institutions, which correspond to the present stage of the integration of science and education.

This entire year we spoke about the necessity of the reasonable, cautious reform of the academy. We adopted a number of important decrees. The presidium of the academy charged the departments of the RAS and the presidiums of the scientific centers to examine the question of the reorganization of subordinate institutions. It is not a matter here of the simple reduction of the number of personnel. The presidium of the RAS posed the task to proceed when performing this work first of all from the topicality and priority of the directions of the research being developed and its conformity to the present world level, having in mind the preservation of the subdivisions and scientific schools, which have the most skilled personnel and unique research facilities and equipment. However, as the analysis of the fulfillment of this decision of the presidium of the academy showed, extremely few serious steps have been taken on the reorganization of the activity of institutes and the revision of their structure.

In our opinion, the unconditional necessity of the measures outlined by the presidium of the RAS should be clear. The aspiration to wait through and postpone the

making of unpopular and actually very painful "surgical" decisions, although making it possible to prolong the relatively peaceful, conflict-free life of the administration of institutes and the executives of departments and scientific centers, can lead only to the gradual actual cessation of research activity and to the spontaneous disintegration of scientific collectives.

In talking about the necessity of seeking new forms of the organization of scientific research, it is impossible not to dwell on the idea of so-called state science centers. This idea evoked, at least at the first stage of its discussion, considerable interest at institutes of the academy. The presidium of the RAS discussed this problem attentively. The results of this discussion briefly reduce to the following. In itself this idea has the unquestionable right to practical implementation, if the base for the center is chosen correctly. The Central Aerohydrodynamics Institute—a prominent institute, the contribution of which to the development of aviation and its related sciences and technologies cannot be overestimated—could, for example, be such a base. However, in the process of reorganizing state administration, when the Ministry of the Aviation Industry, which sustained this institute, disappeared, the Central Aerohydrodynamics Institute found itself cut off from the life support structure and ties with related organizations. It is possible to concentrate them in one group and depending on the tasks set by the country to specify state support. Then the collective of scientists, who are capable of doing unique work, would be preserved. Thus, it is both possible and necessary to establish science centers on the basis of prominent collectives like the Central Aerohydrodynamics Institute or the Institute of Atomic Energy. Yet, of course, not en masse, but individually, having a clear idea of the goal of establishment and of whom the center is being made up.

The inclusion among such centers of institutions of the RAS seems debatable: The academy is not simply the sum of individual institutes, but a community of scientists, who are accustomed not to linking the depth of research with the utility of the end result, a community, which is the guardian of many of the best domestic scientific traditions and is united by the spirit of academic science.

I think that we should continue the work on the **democratization** of our academy. To a significant extent the process of democratization is connected with the scientific atmosphere at institutes of the academy. The scientist, with his right to scientific research and the scientific result, should be the central figure. It is necessary to stimulate in every way various forms of scientific debates, to organize creative seminars, and to publish controversial material.

During the year from month to month the question of the remuneration of labor was examined. The average wage of associates of scientific institutions of the RAS in

September came to about R4,600, which was substantially less than the average for the national economy of the Russian Federation (more than R5,000).

During the coming year changes are planned in the system of the remuneration of the labor of associates of the academy. The academy of sciences is now changing over to a new system of the grouping of associates according to the remuneration of labor. It will make it possible to increase by approximately twofold the remuneration of the labor of personnel of the academy.

The new Russia inherited from the USSR world-level science, with which only U.S. science could compete on equal terms. The creative potential of the Russian Academy of Sciences not only is a thing of enormous human value, but is also a most important strategic resource of the Russian state.

The great scientific potential of the academy and of thousands of scientific associates: enthusiasts, people devoted to science, our numerous institutes, which have great international scientific prestige, laboratories, libraries, museums, and archives—all this creates the basis which is enabling us to look at the future with hope and optimism. There is no doubt that the Russian Academy of Sciences will recover from the present crisis. We simply do not have the right to think otherwise.

Chernomyrdin Hears Scientists' Concerns, Promises Action

*PM2001123993 Moscow IZVESTIYA in Russian
20 Jan 93 p 2*

[Report by Sergey Leskov: "Prime Minister Voices Concern Over Fate of Science, Although There Is No Promise of a King's Ransom"]

[Text] On 18 January Russian Prime Minister Viktor Chernomyrdin visited the Russian Academy of Sciences Presidium. Its most experienced members—such as former USSR Academy of Sciences Presidents A. Aleksandrov and G. Marchuk—cannot remember a head of government honoring the Presidium with his presence, straight after his appointment, what is more.

Journalists were not admitted to the meeting. But IZVESTIYA has information on the conversation. Russian Academy of Sciences President Yuriy Osipov talked about the difficulties basic research is currently experiencing. In 1990 payments to science constituted 5.6 percent of national income; in 1992 this figure was less than 2 percent. The Academy's share of this sum was a mere 10 percent. The budgets of the recognized scientific centers are so meager that they barely had enough means to meet the excessive increase in payments for municipal services, and actual scientific work is all but seizing up. Average pay in the Academy of Sciences system at the end of the year was 4,600 rubles [R] per month, which is considerably below the country average.

There is reason to believe that the Academy of Sciences' material difficulties can only get worse in 1993. According to the forecasts, science will receive R250 billion from the budget, while the Academy of Sciences itself will receive R25 billion—a trivial sum by today's standards. As was the case last year, there will be practically no hard currency funding for science, and the budget will not provide a single dollar for foreign trips.

The Presidium was addressed by Academicians Ye. Velikhov, V. Koptug, G. Marchuk, N. Laverov, V. Kudryavtsev, A. Prokhorov, K. Frolov, A. Gonchar, and other members of the Russian Academy of Sciences Presidium. It was proposed that enterprises be exempt from taxes for three years if they introduce high-technology processes, that the finalization and adoption of laws in the sphere of scientific policy be accelerated, and that concentration be focused on clear-cut, specific goals. A number of speakers took advantage of Vice Premier B. Saltykov's presence at the meeting and criticized the Science Ministry for failing to follow up decisions made by the government.

Naturally, special importance was attached to what V. Chernomyrdin had to say, to the new prime minister's first public pronouncement on science. V. Chernomyrdin admitted that science is going through a difficult period, but it would be unforgivable to ignore its needs. The state has a duty to provide for science, by clearly defining priorities and principal tasks. The prime minister said: "I would not want to be a party to our losing the country by losing science." Great enthusiasm greeted the government head's intention to consult with scientists on economic matters and, as in the years when the Academy of Sciences was a state structure, invite the Russian Academy of Sciences president to participate in the government's work with a voice but no vote.

The prime minister did not promise the Academy of Sciences a king's ransom, which produced a positive reaction from the worldly wise men of science. At the same time, V. Chernomyrdin said, without specifying his choice, that the government would tackle some of the aforementioned problems swiftly and it would carefully study all the others.

Need for Law on Russian Academy of Sciences Explained

*937A0121A Moscow NEZAVISIMAYA GAZETA
in Russian 1 Jun 93 p 6*

[Interview with Academician Oleg Nefedov, by Andrey Vaganov, under the rubric "Details"; place and date not given: "The Russian Academy of Sciences in the Law. Academician Oleg Nefedov Comments on the Draft of the Law on the Russian Academy of Sciences"]

[Text] Vaganov: For two and a half centuries the Russian Academy of Sciences lived under the guidance of a single law—its charter. And then just recently the draft of the law on the Russian Academy of Sciences was submitted

to the committees of the Supreme Soviet of the Russian Federation. What are the factors that were responsible for its appearance?

Nefedov: Yes, indeed, the Academy of Sciences always lived in accordance with its charter. No one ever disputed the competence and capability of its provisions, which the academy itself had incorporated in this charter.

The edict of President Yeltsin on the RAS [Russian Academy of Sciences], which appeared on 12 November 1991, was, of course, very important for us. Our rights were confirmed at the level of the highest official of Russia. In particular, we acquired the legitimization of our rights of ownership of the facilities of the scientific sphere and the infrastructure of the academy.

Vaganov: In this edict of the president of Russia the definition of the academy as "an all-Russian self-administered organization" caused the greatest disputes. Many people regard such a status as absolutely incomprehensible.

Nefedov: I myself believe that this definition is quite apt. What is more, in all subsequent documents, including the draft of the law, this definition has been retained—all-Russian, self-administered. The academy makes sense, when it represents the scientists of the entire country and influences science on the scale of the entire country. Traditionally the academy was a self-administered organization. This is unquestionable. On the other hand, it combined the characteristics of two forms of organizations: public (self-administration) and state (state budget). Finally, another important characteristic of the academy: The RAS is the highest scientific institution of the country, was also formulated in this edict.

Vaganov: If the edict of Yeltsin suited the academy, what can the elaborated draft of the law on the Academy of Sciences add to it?

Nefedov: The edict was signed on 21 November 1991, while on 27 December of the same year the Supreme Soviet of the Russian Federation adopted the decree "On the Delimitation of the Property Rights of the Russian Federation...." I am absolutely certain that the people, who prepared this decree, either were poorly informed or partially forgot the quite new edict of the president. And contrary to what is recorded in the edict, the property of the RAS was grouped with federal property. While in later documents of the Supreme Soviet the right to dispose of the property of the RAS was granted to the State Committee for the Management of State Property. And this committee, without consulting with the academy and even without having informed us, removed a large number of facilities from the jurisdiction of the academy. The law, we hope, will eliminate the question of what we are: only a public organization or only a state organization. We are a unique organization, which it is impossible to place under a single prototype. The main task is to preserve this uniqueness. All our opponents should also have taken this into account. But,

unfortunately, this is not happening. Both the Supreme Soviet of the Russian Federation and many other state structures for some reason are worried most of all about whether or not we are the owners. Although from the start we are assuming the obligation not to derive commercial advantage from the property that we have. We are assuming the obligation not to change the purpose of this property. A completely different thing interests everyone: What is the value of the assets of the Academy of Sciences? Moreover, the following inference is immediately made: Supposedly not the Academy of Sciences as such, but several hundred academicians own this property. But this is complete nonsense! I do not have any additional rights to academic property because of the fact that I am an academician.

Vaganov: What fundamental principles have been incorporated in the draft of the law?

Nefedov: First, the academy was established by the state as the highest scientific organization of the country. This entry specifies our legal status, and it is very correct on the historical level. We do not say by what state it was established and at what time. This idea was initially incorporated by Petr I.

Second, the Academy of Sciences confirms that it lives not only in accordance with its charter, but also in complete conformity with prevailing legislation. We do not solicit for ourselves any additional privileges.

An important part of this law is the goals and tasks of the Academy of Sciences. We assume the responsibility for the conducting of basic research in the basic fields of the sciences: technical sciences, natural sciences, and humanities. We are responsible for the development of basic science no matter where: at scientific research institutes, at higher educational institutions. We are responsible for international cooperation, for the examination of major scientific projects, for the development of new directions in science and technology, and for the training of personnel. Further, we undertake to turn the obtained results over to the state, of course, with the observance of the norms of copyright law.

An entire section is devoted to the financial support of our activity. In conformity with longstanding practice the academy is a state-budget organization. But there is also a new element in this law. We propose that the money for basic science be allocated as a fixed share of the federal budget.

Vaganov: What is this share?

Nefedov: It is not set specifically. But it is very important that this would be precisely a fixed share. This will protect us both against subjectivism in the financing of the activity of the academy and, to some extent, against inflationary processes. Moreover, in the draft law it is indicated that there are also other sources of the financing of basic science: state programs, various funds. All the budgetary and extrabudgetary assets are spent on the fulfillment of the goals, that is, on the production of

scientific knowledge. And, of course, there is the section that is devoted to the property of the academy. Here we use the entries which were adopted by the Supreme Soviet of the Russian Federation in the decree of 1 April 1993 (see NEZAVISIMAYA GAZETA, 8 April 1993—A.V.). At the academy property can be under its complete economic jurisdiction or under its day-to-day management. We insist only on one thing: We can use the property, which has come under the day-to-day management of the academy, for our own purposes without consulting with the State Committee for the Management of State Property or with any other departments.

Vaganov: Among the goals and tasks, which are declared in the draft law, the responsibility of the academy for the development of precisely basic science is stated unequivocally for the first time.

Nefedov: Today about 60,000 scientific associates work at the RAS. This is a very small portion of the more than 3 million people employed in the scientific and technical sphere. It is quite obvious that the academy can and should bear responsibility for the development of only some part of science in the country. And this part is basic research. But we note that the academy is also responsible for basic research in the area of the technical sciences. For today the technical sciences are so complex that they require without fail a basic foundation. Therefore, the strengthening of the ties of academic science with sectorial and VUZ science is very important. On this level the entry in the draft law not only does not segregate the academy from the other sections of the scientific and technical community, but, on the contrary, implies the indispensable integration of the academy with this community.

S&T Privatization Needs More Coordination Between Ministries

937A0121B Moscow *SEGODNYA* in Russian
No 21, 1 Jun 93 p 7

[Article by Veronika Romanenkova under the rubric "Science": "Privatization in the Sphere of Science: Everything Is Going on Sale"]

[Text] Precise data regarding the privatization of scientific organizations do not exist, but there are the conjectures of experts that their number comes to about 100, although in the summary of the State Committee for Statistics there is the figure seven. This is very strange, since 37 scientific institutions have already been privatized just by directives of the government of Russia. The majority of these organizations are of the military type.

The process of the denationalization of science, which has been stepped up in recent months and is being carried out by the State Committee for the Management of State Property, does not take into account the opinion of either the ministry of science or the ministries that supervise the work of sectorial institutes. They learn about this as a fait accompli, although for an entire year now the Ministry of Science, the

Higher School, and Technical Policy, when preparing drafts of documents on privatization and improving them, has been periodically sending these documents to the State Committee for the Management of State Property. One might think that they are waiting for "the complete perfection" of the proposals of the Ministry, if privatization were not already in full swing. Moreover, at 1990 prices, that is, practically free of charge, and on the same basis as everyone else, that is, like any barbershop, bathhouse, or store.

A specific nature of scientific institutions still exists, and in contrast to a shoemaker's shop it is necessary to take into account many questions that are connected with intellectual property and the experimental base. Otherwise Russia may lose priority developments, including military ones, while the front of basic operations, which does not yield an immediate profit, will inevitably and irretrievably become narrower.

In order not to allow such a development of events, specialists of the Ministry of Science, the Higher School, and Technical Policy are also preparing their own proposals. First of all in them there is the singling out of a portion of the scientific organizations, which are not liable to privatization until the state has established control over the results of their activity. These are for the most part defense scientific research institutes.

In the second group are the institutes, which it is possible to privatize with allowance for the peculiarities of the formed business climate of science. This means that after the "buyout" a laboratory can change its specialization to a more profitable one under present economic conditions. But for this group it is proposed to specify the procedure of securing a controlling interest in the hands of the state and to develop a mechanism of possible "reprivatization," if the state again needs some studies or others, which, in its opinion, would be key ones at that moment.

It is also necessary to take into account the authoritativeness of the "firm," the intellectual potential that is invested in it. It is possible to do this, in the opinion of Andrey Kulagin, deputy chief of the administration of economic and legal regulation of the Ministry of Science, the Higher School, and Technical Policy, by means of expert councils. If you ask 100 authoritative scientists to draw up lists of the leading centers, they will coincide practically completely. True, perhaps, because each expert will enter in the list first of all his own institute and that of his closest partner, who, in turn, will do the same thing.

Ideally denationalization should be carried out not according to the "auction" principle (whoever will pay more), but according to the competitive principle, which gives preference to the buyer who will preserve the scientific themes. But one must not count on its observance. Therefore, the present activity of the State Committee for the Management of State Property may lead to staggering results: In a few months too much will have been lost for Russian science.

Official Expresses Fears Over Foreign S&T Aid

937A0111A Moscow *NAUKA I BIZNES* in Russian
26 Feb 93 pp 9, 10

[Interview with Academician Vladimir Skulachev, chairman of the Russian Advisory Council of the International Science Foundation, by Vladimir Pokrovskiy; place and date not given: "And Let No One Leave Offended..."—first paragraph is *NAUKA I BIZNES* introduction]

[Text] After a month and a half of work the International Science Foundation is publishing the terms of the competition of the first, \$500, phase of its program. At the same time as this the information embargo, which was mentioned in the next to last issue of *NAUKA I BIZNES*, is being lifted, and today Academician Vladimir Skulachev, chairman of the Russian Advisory Council of the International Science Foundation, answers all questions.

Skulachev: As is known, during the discussion of the "first phase" rather serious differences arose among the various structures of the foundation, and as a result George Soros even deprived the American board of the International Science Foundation of the right to vote. Over what were there such serious disputes?

The disputes dragged on for the entire month and a half, but I would not say that they were too serious. There was no antagonism between us and the Americans, everyone wanted agreement, everyone wanted the best, all the disputes were of a purely working nature.

But, you know, there is the following German proverb: "Hundert firzig professoren!.. Faterland, du bist verloren—One hundred forty professors!.. Fatherland, you have been lost!" On the American board there are approximately just as many professors. Each of them has a reputation, which at times is well known to the Nobel Committee, each one is well aware of his worth and renounces with difficulty a once expressed idea. As soon as George Soros, who had put all the affairs of the Foundation into the hands of scientists themselves, understood that the disputes of "hundert firzig professoren" were threatening to drag on for a long time, to speed up the process he decided to deprive the board of the right to vote and turned over the helm to a far smaller executive committee.

The main difference between our council and the American board concerned the formal approach to the selection of candidates for grants, which was proposed by me and Alex Goldfarb, executive director of the foundation, and which required of a candidate only three publications in prestigious scientific journals. Physicists and, for the most part, mathematicians criticized such an approach. They wanted everything to be done in a civilized manner.

You send an application with a detailed description of your work, the application is forwarded for examination

to a recognized authority, and, depending on his evaluation, you receive or do not receive a grant.

But here our American colleagues did not take into account that in this case there will be an enormous number of applications, that it is simply impossible to handle them in a short time. And the main thing is that the first phase is the phase of emergency aid, it settles not a scientific question, but the question of elementary survival, with which in America, I think, scientists have never been faced. Here it does not work "in a civilized manner." To the honor of the American colleagues I should say that they quickly recognized their mistake.

It was more difficult to settle the matter with Baltic scientists, who also did not like the formal approach—Baltic science cannot boast of too large a number of articles in prestigious journals. They accepted our idea in a very nervous way and in early February gathered in Riga at a congress of scientists, to which, incidentally, all three Baltic premiers came. The essence of the demands of the scientists reduced to the fact that the Baltic region was never a part of the Soviet Union, but was a zone which had been occupied by the Soviet Union. Baltic science, it was stated at the congress, had suffered greatly because of the occupying forces, and for this reason it is unfair to apply the same standard to it and Soviet science. And, consequently, the Baltic region needs its own, separate Soros Foundation.

One can agree or not agree with these arguments, but a fact remains a fact—they actually have few prestigious articles. The International Science Foundation is setting as its goal the support of already available scientists, and not those people who might have been, had the Ribbentrop-Molotov Pact not come to pass at one time. It is possible to establish a foundation for the eradication of historical injustice, but this will be a foundation with completely different goals.

Alex Goldfarb, who came to the congress, succeeded in convincing the Baltic scientists of the correctness of the formal approach, but the premiers remained of the same opinion. They addressed to Soros a letter, in which they asked that a separate foundation be established for the Baltic region. George Soros did not agree to this.

The disputes about what in the end the formal approach should be were far less dramatic, but far more draining. At first we did not have any information and the first estimates in practice had to be made up. The Russian Advisory Council at first considered that at least one article, which had been published in a more or less prestigious scientific journal in the last five years, should be the cutoff requirement for a candidate for a grant—here we expected the influx of somewhere around 50,000 applications. Then the data of Garfield somewhat dampened us—according to estimates of the Philadelphia Institute of Scientific Information, during 1990 alone more than 30,000 Soviet articles were in the journals which they include in their statistics. If you multiply all this by five years and take into account the number of

joint authors and so on, it turned out that we would receive up to 1 million applications.

It would have been possible to mobilize "all of Moscow" for the processing of the applications, but in any event a vast number of "offended people" remained left out. Previously due to inexperience we omitted this aspect, George Soros directed our attention to it. We again returned to the cutoff of three articles.

The problem of limiting the number of offended people arose time and again. For example, when everything had already been signed and settled, literally at the last moment it turned out that we were unintentionally about to offend on the order of 100,000-120,000 people. The point is that 5 percent of the people, who will receive a grant and have the largest number of impact factors, obtain the opportunity to distribute an additional \$1,000 among four of their associates. The names of these four from the very start should have been put down in the questionnaire...and there would have arisen a large number of most unpleasant situations, when you, who published the three required articles, all the same did not receive a grant, while your colleague, who does not have articles and, perhaps, is not at all a researcher, proudly "rustles three-ruble notes."

Or when one laboratory assistant received a grant from the head of the laboratory, while his colleague, who is far more qualified, was duped.

It is easy to eliminate all this unnecessary friction and friction similar to it by a simple change of the procedure.

It has now been decided first to select the people, who will be among the 5 percent, and then to send them letters with the suggestion to give the names of their candidates. In short, today, according to our estimates, the same number of people will not receive a grant as will receive one—we consider such a version satisfactory.

Pokrovskiy: And how many scientists in all will receive a grant?

Skulachev: This number also varied during the last three months. Now George Soros has decided that it will depend on the number of submitted applications. He is even prepared for 20,000 people, but, as we believe, this number will be limited to 10,000-15,000.

Pokrovskiy: Was there any friction or opposition on the part of state structures?

Skulachev: Absolutely none. It is even the other way round. Boris Saltykov gave us enormous help, Aleksey Yablokov gave us much support. Well, perhaps, some hidden jealousy was felt on the part of the Academy of Sciences, but in human terms this is entirely comprehensible and justified—after all, at the beginning of the year the Russian Basic Research Foundation announced an application campaign, on completely different principles, with different sums and different denominations.

Pokrovskiy: The Advisory Council is now beginning the working out of the details of the second phase of the program—the distribution of grants for research. At this stage you will no longer manage without impact factors. What procedure is being proposed here?

Skulachev: For the present it is still difficult to say specifically, but we will almost for certain use with some modifications or others the procedure that has been adopted in the U.S. National Science Foundation—so-called peer review. We will send your application, which is far more detailed than the questionnaire of the "first phase," to one of the most authoritative scientists in the given narrow specialty, while they will evaluate how justified your aspirations to a grant are.

Pokrovskiy: And how do things stand here as regards the speed of the processing of applications? Will the best scientists in the world not be lost in their flood?

Skulachev: We will try to limit this flow with specific requirements. But for this present all this is very preliminary talk.

Pokrovskiy: With respect to the formal approach to the selection at the first phase of programs one has occasion to hear time and again a large number of critical remarks. How do you yourself evaluate the drawbacks of such an approach?

Skulachev: It, indeed, is not without drawbacks, although not always to the degree to which they are now criticizing it. It has shortcomings, perhaps, even very substantial ones. But here it is as with democracy—it, as Churchill said, is far from beyond reproach, but all the same nothing better has been invented. All the other versions, which were proposed, led either to the excessive increase of work or, what is far more serious, to an enormous number of "offended" people or in general to international conflicts.

In fact we are now conducting a scientometric experiment which is unprecedented in the history of science. All scientometrists, I think, will follow with extraordinary interest how everything ends. It is merely a pity that very little time was allotted for the development of the entire procedure. We would have needed on the order of half a year, but the situation with Russian science did not make it possible to lose a day.

Problems With Administering Soros Fund Discussed

937A0111B Moscow *NAUKA I BIZNES* in Russian
26 Feb 93 pp 9, 10

[Interview with Deputy Minister of Science, the Higher School, and Technical Policy of the Russian Federation Zurab Yakobashvili by *NAUKA I BIZNES* correspondent Vladimir Pokrovskiy; place and date not given: "Can the Support Fund Do Harm?"—first paragraph is *NAUKA I BIZNES* introduction]

[Text] Zurab Yakobashvili, who about five months ago exchanged the chair of deputy director of the Central Economics and Mathematics Institute for the chair of deputy minister of science and is now responsible for the state of the international scientific and technical ties of Russia, is very disturbed by the forming situation. In a conversation with our correspondent Vladimir Pokrovskiy he stated that without the proper coordination of the actions of foreign sponsors with Russian state structures the aid may do more harm than good.

Yakobashvili: On the one hand, our science actually urgently needs aid. And we thank those who are giving it sincerely. On the other hand, we do not have the right to dictate our own terms to the owners of the money. At the same time the lack of coordination of actions can have the result that the system (and the scientific and technical complex of the country is a system with interlinked elements) will be, to put it mildly, out of balance.

Today the managing structures are financially weak and cannot fully fulfill their obligations with respect to the scientific community, which is going through the most difficult times. However, under these conditions a specific state policy, which consists in the assurance of a balance between the survival of the bulk of the scientific and technical complex and the selective support of the most priority fields, is also being implemented.

Against this background a potent source of additional resources, which is beginning to influence the system independently, is appearing. I guarantee that distortions, tensions, and in some places serious rifts will appear—or, taking into account the present realities, to put it more correctly, will intensify. Even if this source pursues exclusively good goals.

The situation is especially delicate when the matter concerns external foreign sources. For it is absolutely clear what kind of assessments this will evoke and is evoking.

In order to avoid possible negative consequences, the coordination of the activity of such structures and in a certain sense agreement with the policy being pursued in the country are necessary. Here by "coordination" and "agreement" I do not mean some administrative intervention and a bureaucratic resolution. There is the normal concept of a council, within which such coordination can also be carried out.

Pokrovskiy: In saying all this, do you have in mind the International Science Foundation, which was established by George Soros on the \$100 million donated by him for the support of the basic sciences in the countries of the former USSR (hereinafter simply the Soros Foundation—V.P.)?

Yakobashvili: In particular, it. But not only it. There exist, for example, several million ECUs [European Currency Units], which initially were allotted by the European Commission within the framework of the Mitterrand initiative for aid to science of the former

USSR, but then were transferred to the International Association for the Support of Cooperation With Scientists From the Independent States of the Former Soviet Union, which is presently being established.

You, of course, have detected the difference between the initial statement of the question and the final destination of the assets being allocated. In strict conformity with it our colleagues from the European Commission gathered information from European scientific centers and are selecting projects in accordance with their priority. There were no consultations on our part, with the exception of the participation of several Russian scientists in lobbying. Of course, with regard to a portion of the projects the priorities will coincide. The guarantor of this is applications from such scientific centers of Europe as CERN [European Council for Nuclear Research], Trieste, and others.

But, I guarantee, there will also appear such ones, where not only our, but also the national priorities of Western countries will be perceived with difficulty! If only the fact that among the applications there is not one in chemistry, demonstrates the random nature of such "selection."

But the ECUs of this association will have a definite influence on our scientific sphere, although in their overwhelming majority they will never get to Russian scientists.

Concerning the Soros Foundation. If you take into account the exchange rate, the role of which for science is the topic of a separate discussion, it will come to on the order of 7-8 percent of the amount of expenditures on science, which was visualized in the budget message for 1993. Compare: The Russian Basic Sciences Foundation comes to 3 percent. As a whole in the area of the financing of the basic sciences the alignment of forces "Soros Foundation—the state" appears as approximately 0.5-0.6:1. Think a moment: Is coordination needed here or not?

We often have occasion to here—we do not want to deal with bureaucratic structures, we will act directly. I will not go now into a discussion of how things stand with this question in the West. But the same Soros admitted once that Americans would hardly like the establishment and absolutely independent activity of a similar Japanese structure on their territory.

In posing the question of coordination, we are trying to demonstrate that our policy is based on the recommendations of a significant number of scientific councils, to which leading scientists of the country belong, and we propose to include in coordinating bodies precisely prominent scientists and specialists.

Moreover, we are trying to direct the attention of our foreign opponents to the fact that if they are proclaiming the necessity of government support of reforms, throughout the world the government is state structures.

Pokrovskiy: Your apprehensions are quite understandable. Has anyone conducted more detailed forecasting studies of the consequences of the lack of coordination of actions, about which you are speaking?

Yakobashvili: No, such studies have not been conducted. At present, as far as I know, the Analytical Center of the Ministry of Science, the Higher School, and Technical Policy and the Russian Academy of Sciences has set to work on this. But it is possible already now to single out several problems, due to which serious problems may arise.

In my opinion, the most urgent question concerns the right of the disposal of and the ownership of already obtained results of scientific and technical activity. Under the conditions of rapidly growing contacts with the outside world and, let us face it, the prospects of obtaining certain benefits legal disorder can give rise to conflict situations. Of course, it is necessary here to dot the legal "i's." But we will not talk about this now. Under the real conditions of today it is necessary to concentrate on the prevention of possible tensions. Here, I think, joint work is more effective.

Another problem is weak resistance to the temptation "to get a bird" in the hand. The drain of results of domestic science is great. Here by drain I mean any transfer of the results of scientific and technical activity abroad, without equivalent returns to Russia. It is self-evident—scientific and technological exchange should be supported and developed in every way. But should we resign ourselves to a dumping sell-off?

Here we are being faced with difficult situations, to which our poverty gave rise. Of what is it possible to accuse a manager, who sold for a song—and, knowing his situation, they did not give more—for example, a report on laser technology and channeled the received assets into the preservation of his scientific structure?

Pokrovskiy: But what about the Soros Foundation? What is its danger?

Yakobashvili: First, let us be correct. I do not think that George Soros deserves his name to be combined with such concepts as "danger." As far as I know, he has not earned a cent in Russia. The man is donating his own money, he also did this earlier—I can cite specific examples. Therefore, he at least has the right to expect gratitude on our part. Moreover, his philosophy, in contrast to several other foreign organizations and persons, is not to allow the process of the "brain drain" to develop (within the Foundation the allocation of grants to those scientists of ours, who return to Russia, is even envisaged), to support researchers here, on the territory of Russia, and to preserve the existing leading schools. His only condition: The results of basic research—and the support of the Foundation applies precisely to it—should be the property of the world community. But results of this sort as it is are most often of all the property of all mankind.

The automatic carrying over of the mechanisms and policy of similar foundations from the West to our specific conditions is causing apprehension. With allowance made for them the orientation toward a selective nature of support seems unjustifiedly hypertrophied. Selectivity in everything: limitedness with respect to the fields of science, concentration on exclusively basic problems. I, for example, did not succeed in convincing people of the necessity of supporting even such socially important fields as clinical research, pharmacology, and so on.

Selectivity is good wherever the question of elementary survival is not arising, otherwise it can cause in the community serious social tensions which are fraught with the most serious consequences.

The support of, if it can be put this way, "general-purpose projects"—such as the development of a telecommunications network for science, the acquisition of literature and periodicals, and so on—is envisaged in the plans of the Foundation. But, first, the share of the assets, which have been allocated in this direction, in my opinion, should be larger; second, all the "announcements" regarding the Foundation for some reason reduced in practice to personified grants, while little is being said about other directions; finally, here the coordination of actions is simply necessary—we are also contributing something here. Moreover, in such fields as telecommunications it is hardly possible to divert our attention from the role of state bodies—whether we like it or not.

Here is an example of the lack of coordination of actions. The president of Russia ordered an edict, which exempts the money of the Soros Foundation from taxes and customs duties, to be prepared. It is a wise and very necessary thing...but, alas, it is placing the ministry and the scientific community as a whole in a racy position. For there are not that few "grant givers" of this sort—true, not as powerful ones. Under the conditions of the vagueness of our legislation with the help of two committees of the Supreme Soviet we in principle reached agreement both with the custom house and with the tax department on the exemption of grants from duties and taxes. For the curbing of abuses we developed an examination procedure. Its essence consists of the following: If the grant comes from a well-known source, you receive an exemption certificate in three days; if the source is little known, but the "scientific orientation" of the grant does not raise doubts, you receive it in a week; if both raise doubt, with the enlistment of an expert council, to which our leading scientists belong, the matter will be settled in a month at most.

But all this, unfortunately, has a weak legal basis—it is based more on a well-disposed interpretation of the vague points in the law. And if an edict, which exempts only the Soros Foundation, appears, an obvious question will arise: So is everything else illegitimate? Therefore, we are insisting on the solution of this problem as a whole.

Pokrovskiy: Coordination and agreement are the products of at least the nonresistance of both parties. What is the situation as regards nonresistance on the part of the West?

Yakobashvili: There is progress. The intelligent and well-disposed partners are treating our position with understanding. We are interacting rather well with the German side, there is progress with South Korea, we are finding common ground with the French. We have made some progress in the talks with the European Commission and even NATO.

As for the Soros Foundation, here cooperation is also being organized. As is known, the Russian Advisory Council, to which eight prominent scientists belong, has been established within the Foundation. B. Saltykov is also a member of the council, and he is doing much there. However, formally he is represented there not as a minister, but rather as a specialist. I would like, first, that the Russian side would have not only a consultative voice and, second, our undoubtedly respected academicians, who are participating in the work of the Foundation, would have a certain "mandate for representation" of the Russian side, optionally from us, even if from the Russian Academy of Sciences. This would avert the appearance of any idle conjectures.

As far as I know, the structure of the management of the Foundation is now being revised. Incidentally, all the information about it, about the rules of applications, and so on and so forth will be published in late February or early March. This is information for those people who have already showered us with projects, applications, and proposals.

And the final thing, as I have already said, a consultative voice for us is not the limit of dreams. Although with great difficulty, we are establishing the Russian Foundation for the Support of Scientific and Technical Cooperation. And we will try to ensure its representation in the "boards of directors" of various foundations and associations, which intend to cooperate with our scientific circle. In this case we will get, though not a decisive voice, a full-fledged voice. Moreover, we will persistently recommend our leading scientists for membership in the corresponding scientific councils and expert groups, striving here for the representation in them of a broader group of people than is being observed today. This, I hope, will aid the solution if only of a portion of the problems which have been discussed.

Makarov Reviews Russian Academy of Sciences Budget Problems

937A0116A Moscow POISK in Russian
No 14 (204), 2-8 Apr 93 p 3

[Article by Igor Makarov, chief science secretary of the Russian Academy of Sciences: "The Russian Academy of Sciences Cannot Live Without a Budget"; first paragraph is source introduction]

[Text] As we already reported, the annual general assembly of the Russian Academy of Sciences took place on 24 March 1993. Today we acquaint the readers of POISK with a report given by Academician I. Makarov and with several addresses (in condensed form) given by participants of the assembly.

The issue of the financing of scientific research remained quite critical in the year under review. I will not bother to recount to all of you the well-known events that we have been through in connection with our financial difficulties. I will simply focus attention on the fact that in early 1993, the Unified Labor Wage Scale was introduced at science institutions of the Russian Academy of Sciences. Unfortunately, the wage-scale grouping it specified for scientific associates, especially those with high-level credentials—candidates and doctors of sciences—does not match the role or importance of their work, minimizes the social value and prestige of the scientists, and does not encourage research personnel to improve their credentials, especially in the Russian Academy of Sciences system.

In connection with that, the presidium went to the government and asked that the Unified Labor Wage Scale be revised on that score, and we managed to get fundamental agreement from Prime Minister V. Chernomyrdin about the introduction for Academy workers of a 1.5-fold adjustment factor as applied to the unified wage rates.

As you know, the difficult financial and economic situation prompted the presidium of the Russian Academy of Sciences in March and September 1992 to adopt two decrees in which it was suggested to the directors of specialized departments and science institutions that they implement a series of rather strict measures to reorganize the institutions of the Russian Academy of Sciences and restructure financial policy in order to keep as many as possible of the most highly skilled personnel and capital assets, primarily unique research installations and equipment. The question of the need to revise the entire existing system of science institutions of the Russian Academy of Sciences was touched upon, as was that of the advisability of the existence of relatively small organizations whose scientific productivity and contribution to basic science are small.

It must be said that the leadership of the Academy expected those decrees to produce a considerably greater effect. But analysis of the data associated with their implementation indicates that, in many institutions, the desire to postpone the implementation of truly needed, but rather painful decisions still predominates.

In accordance with a commission issued by the general assembly, the presidium of the Russian Academy of Sciences has devoted its attention to searching for additional sources of financing for the Russian Academy of Sciences. At the initiative of the president of the Russian Academy of Sciences, Yu. Osipov, there was a meeting of the Moscow city government and the presidium of the

Russian Academy of Sciences, and they signed a joint decree that approved two important programs: the Program of Joint Operations of the Moscow City Government and the Russian Academy of Sciences (Science for Moscow) and the Program of Socioeconomic Support of Scientists and Growth of the Material-Technical Base of Science Institutions of the Russian Academy of Sciences (Moscow for Science). In accordance with that decree, the city will provide a total of nearly 400 million rubles [R] in financing for work performed by many Academy institutes doing research that is in the interests of the city, and it will help the Academy solve important social problems. Approaches have been found to reduce outlays for the maintenance of the premises of the institutes. That experience will be useful for other science centers.

The presidium of the Russian Academy of Sciences has revived somewhat its activity in the development of state scientific-technical programs and in the participation of the Academy science institutions in the implementation of those programs. Russian Academy of Sciences Vice President N. Laverov did a great deal of work to clarify the status of federal programs, build up research in priority areas, and increase the volumes of their financing. To do the work called for in the programs, Academy institutes received R2.4 billion in 1992.

Commissioned by the general assembly, an analysis was conducted of the activity of commercial structures functioning primarily at institutes. The last three years have seen the creation of more than 500 such structures, the majority of which are primarily scientific-production and technology-transfer structures.

They create new work places and help keep science and engineering personnel; they cover part of the costs of leasing spaces, equipment, and municipal services; and they cover the cost of the maintenance and repair of expensive installations. In a number of cases, they make it possible to strengthen the material-technical base of institutes and to solve certain social problems.

At the same time, instances of financial infractions and abuses are not rare when there are interactions with commercial structures. State budget appropriations are infused into commercial structures; spaces, as well as instruments and equipment acquired through the state budget, are placed at their disposal, etc. That is why officials of institutes and the Academy need to approach the creation of commercial structures thoughtfully, observing normative and legislative acts.

Another source of financial resources for the science done by certain institutes, organizations, and enterprises of the Russian Academy of Sciences is the leasing of space and other property.

The presidium of the Russian Academy of Sciences decided that 20 percent of the money (including foreign currency) received by the institutions of the Russian Academy of Sciences for the leasing of space and other property is assigned to special accounts of the Academy

for additional support of basic research, for the development of international science collaboration, and for the solution of problems associated with the social protection of the Academy workers. Only a lack of understanding of the meaning of that decision can explain the fact that by 16 February of this year, a total of only 15 institutes had registered 78 of their leasing agreements, which, according to the estimate of the Administration of Affairs, accounts for roughly 10 percent of the actual number of existing agreements.

The difficult financial situation, the need to acquire expensive equipment, and the month-to-month financing is causing a number of Russian Academy of Sciences organizations to need to take out bank loans that are often one-sided. To avoid that kind of thing, the presidium of the Russian Academy of Sciences, in accordance with a decision of the general assembly of the Academy, acquired under its own control Rosakadembank, which has been in existence in Moscow for two years already. The Russian Academy of Sciences has a controlling block of shares in that bank.

The enumerated measures lead logically to the idea of creating a streamlined system of financing for the Russian Academy of Sciences in market conditions.

The time has probably come to put the question of introducing into the life of the Academy a concept such as a Russian Academy of Sciences budget. A budget, and not a plan for financing research, should, in our view, be the basis for the mechanism for effecting a financial policy for the Academy. A budget would take into consideration all sources of finance revenues, including additional money from the disposal of its property, the activity of Rosakadembank, and other things. That also implies the drawing up of a sensible policy in terms of the economical expenditure of Russian Academy of Sciences financial resources in the interests of the growth of science.

In completing this review of questions associated with the implementation of the decisions of the general assemblies, I must say that, unfortunately, several things that were commissioned have not been fully implemented. In 1992, the development of the concept of the Russian Academy of Sciences' activity in the context of new socioeconomic conditions was not completed. The creation of a system of scientific study of Academy science institutions is only in the very initial stages. There is no package of proposals associated with a system of state orders for scientific research, with the financing of that research, with logistical support, or with the development of an integrated state program for the revival of Russia, including conversion issues. The reasons for that are found both in our lack of organization and in the absence of an integral state science-and-technology policy.

The decline of the social status of science and scientists has had a negative effect on the manpower potential of the Academy. The number of young specialists taken on

in positions of researcher trainees has been halved, and the number of those wishing to enroll in graduate school is down by more than one-third. Today, 13 percent of Russian Academy of Sciences workers receive an age-related pension. Over the year 1992, the total number of scientific associates at science institutions of the Russian Academy of Sciences dropped by 7.5 percent.

Capital Construction. In the year under review, several science facilities with a total of 53,000 sq m of floor space were put into service. Among them were the second construction start for a new building of the Russian Academy of Sciences (Lenin Prospect, 32a), a genetic-engineering building at the Institute of the Biochemistry and Physiology of Microorganisms (city of Pushchino), a construction start for an Institute of Nuclear Research linear accelerator (city of Troitsk), a boiler room for the funded greenhouse of the Main Botanical Garden, and the engineering-laboratory building of the Saratov affiliate of the Institute of Radio Engineering and Electronics.

Dwellings with a total of 26,000 sq m of floor space have been rented out in the city of Pereslavl'ya-Zapesskiy, the settlement of Borok, the city of Shatura, the city of Gatchina, the city of Makhachkala, and other places. Housing construction is under way in Pushchino, Tarusa, Troitsk, St. Petersburg, and Apatity.

As for the housing problem in Moscow, I can report that a joint decision by the presidium of the Russian Academy of Sciences and the Moscow city government calls for the allocation of living space in 1993 to people on waiting lists since 1981, as well as for the sale on favorable terms to the Russian Academy of Sciences of 20,000 sq m of living space. That is especially important since the waiting list for improved housing has grown to 11,000 people—that's 2,840 families. I would note that in Moscow in 1992, the Academy received a total of just 614 sq m in house-building cooperatives and not a single square meter of state space.

Last year, we managed not only to keep the network of **Russian Academy of Sciences health-care institutions** intact, but also to put into service a second, 300-visit-per-shift section of the polyclinic in the settlement of Chernogolovka. Contracts have been concluded with Hungarian firms for the delivery of modern medical equipment and gear for a central clinical hospital, with polyclinics, for a sum of \$545,000. The requisite drugs were purchased for \$500,000.

As before, however, there are problems with the provision of hospital beds, especially in Moscow (the construction of the general clinical hospital in Uzkiy is not yet finished), and the situation with drugs continues to be problematic—only 7-50 percent of the drug needs are being met.

Decisions of Presidium of Russian Academy of Sciences

937A0118A Moscow VESTNIK ROSSIYSKOY
AKADEMII NAUK in Russian No 3, Mar 93 p 288

[Announcement of decisions made by the Presidium of the Russian Academy of Sciences: "The Presidium of the Russian Academy of Sciences Has Decided"]

[Text] It has been decided to create in Moscow an Institute of Applied Science Problems (IPNP) of the Academy of Sciences of Ukraine and of the Russian Academy of Sciences. The new institution is to be formed for the purpose of consolidating the potential of the two academies to conduct research in areas that represent priorities for both states. Appointed as director of the institute is Dr Tech Sci I. P. Petukhov. The principal areas of scientific activity of the institution will be as follows:

gas dynamics and physical chemistry of high-velocity streams

electrodynamics of solid media

physics of short-lived collective processes in various media

problems associated with chemical sources of current

Academician Ye. P. Velikhov has been confirmed as chairman of the Science Council for Applied Problems of the Russian Academy of Sciences.

Academician V. A. Kotelnikov has been confirmed as chairman of the Science Council for the Integrated Problem "Radiophysical Methods of Study of the Seas and Oceans" of the Russian Academy of Sciences.

The Interdepartmental Council for Seismology and Earthquakeproof Construction of the USSR Academy of Sciences has been reorganized into the Engineering and Coordination Seismological Center of the Russian Academy of Sciences. It has been decided that the Center will be part of the Department of Geology, Geophysics, Geochemistry, and Mining Sciences of the Russian Academy of Sciences. Russian Academy of Sciences Corresponding Member A. V. Nikolayev has been appointed to carry out the duties of director of the Center.

The Consolidated Science Council for the Study of the Arctic and Antarctica of the Russian Academy of Sciences has been set up in the Presidium of the Russian Academy of Sciences. Confirmed as its chairman is Academician N. P. Laverov. The logistical and financial support of the work of that council has been assigned to the Science-Coordination Center for Arctic Research and the Russian Academy of Sciences Institute of Geography.

A decree has been adopted for setting up the International Center for Science and New Technologies of the Russian Academy of Sciences (MTsNNT RAN). Its main purpose is to support the development of timely

science areas and scientific-technical advances in the new technologies in institutes and subdivisions of the Russian Academy of Sciences by means of collaborating with leading foreign partners. The Center is to be part of the Presidium of the Russian Academy of Sciences.

It has been decided to set up the National Committee for Welding of the Russian Academy of Sciences. Confirmed as its chairman is Academician I. V. Gorynin.

The decree "State and Prospects of Basic Research in the Field of Historical Sciences" has been adopted. The end of the 1980s and the beginning of the 1990s, the decree notes, signaled a turning point in the development of history-related knowledge, in the rethinking of what had been achieved, and in the solution of problems that had come to a head. What is needed is the development of important research topics that had been forbidden under the totalitarian-bureaucratic regime and an in-depth study of the so-called blank spaces. It has been proposed that the Russian Academy of Sciences Department of History effect the reorganization of institutes to comply with the decree of the General Assembly and the Presidium of the Russian Academy of Sciences. That primarily pertains to a renovation of research areas via the development of new, progressive ideas and to a change of the organizational structure of the science institutions of the Russian Academy of Sciences in the field of history on the basis of a renovation of problem areas.

The Bashkir Science Center of the Ural Department of the Russian Academy of Sciences has been changed to be the Ufa Science Center of the Russian Academy of Sciences.

Confirmed as the editor in chief of the journal PARAZITOLOGIYA [Parasitology] is Dr Biol Sci Yu. S. Balashov.

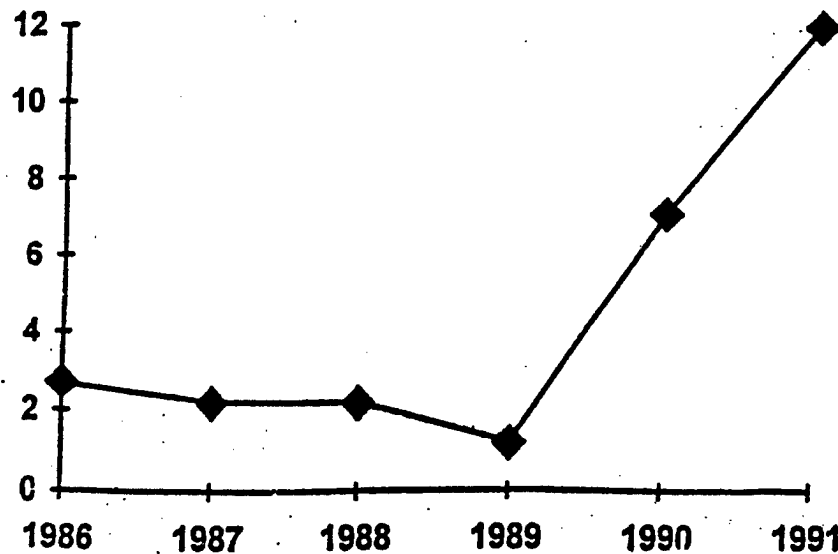
Confirmed as the editor in chief of the journal GEOEKOLOGIYA, INZHENERNAYA GEOLOGIYA, GIDROGEOLOGIYA, GEOKRIOLOGIYA [Geocology, Engineering Geology, Hydrogeology, Geocryology] is Academician V. I. Osipov.

Statistics on Growth of Russian Academy of Sciences

937A0115A Moscow NAUKA I BIZNES in Russian
19 Mar 93 p 11

[Article by M.L.: "Almost Everything About Russian Science"]

[Text] On 10 March the Analytical Center of the Russian Academy of Sciences and the Ministry of Science and Technical Policy presented to journalists its two-volume work *Nauka Rossii segodnya i zavtra* (*The Science of Russia Today and Tomorrow*), which was done on the order and at the expense of the Ministry of Science, the Higher School, and Technical Policy. Not by chance was



Dynamics of the rate of decrease of the number of scientific personnel (in percent) during 1986-1991

the center chosen as the performer of this work. First, this collective and the experts collaborating with it have experience in preparing similar projects and, second, for certain reasons access to the entire collection of necessary information that exists outside the center was made easy for them. As a result we have the most exhaustive and in-depth material today on the state of affairs in the scientific and technical sphere.

As compared with a similar analytical report, which was published at the beginning of last year, the current one differs favorably by the amount of presented information, the approach to its systematization, and expanded themes. For the first time the regional aspects of scientific and technical policy, migration processes, the state of affairs in the defense sectors...are examined.

The emphasis in the selection and presentation of information is placed on the economic component of the problem. By the admission of Doctor of Physical Mathematical Sciences D. Piskunov, scientific supervisor of the Analytical Center, the sociological, cultural studies, and psychological aspects are practically absent in the work. Of course, this impoverishes somewhat the overall picture, but the exclusively pragmatic, functional approach to the analysis of the materials is not accidental: They are intended first of all for the people, who form state scientific and technical policy and are authorized to make the corresponding decisions. The two-volume work is aimed in practice at all state and other structures, which are concerned with the question of the formation and implementation of this policy. It will also

be accessible not only to statesmen: Everyone interested will be able to familiarize himself with it, having visited, for example, any of the largest Russian libraries, especially scientific and technical ones.

The conclusions, which were drawn by the collective of authors with regard to the present means of implementing state policy in the area of science and technology, will probably not be received with particular enthusiasm by everyone, including the client of the performed work. But no one will be able not to admit that the most valuable support for the correction of the chosen course has appeared. It remains only to agree with the creative collective that such correction is necessary.

Number of People Working at Scientific Institutions of the Russian Academy of Sciences (Including the Regional Departments; on 1 January)

	1990	1991	1992
Total number, thousands	159.4	160.9	159.7
Including scientific workers	65.5	66.1	65.8
Of them:			
Doctors of Sciences	6.5	6.7	7.3
Candidates of Sciences	30.3	31.6	29.8
Scientific associates without degrees	27.8	26.8	27.6
Number of academicians	309	337	361
Number of corresponding members	569	651	716

Scientific and Technical Cooperatives (At the End of the Year)

	Number of Operating Cooperatives	Number of Personnel, thousands	Receipts From the Sale of Products (jobs, services), millions of rubles
Total			
1988	1129	26.6	95.9
1989	6250	188.3	2262.3
1990	7787	192.5	3115.5
1991*	7870	200.0	3012.0
Including:			
scientific research			
1988	280	7.0	29.1
1989	1996	72.1	771.5
1990	2583	66.6	1029.8
planning and design, introduction			
1988	451	11.9	30.2
1989	2122	67.8	528.5
1990	2650	75.7	800.2
software development			
1988	398	7.7	36.6
1989	2132	48.4	962.3
1990	2554	50.2	1285.5

* Estimate of the Analytical Center for Problems of Socioeconomic and Scientific and Technical Development of the Russian Academy of Sciences.

Physicists Answer Poll on 'Brain Drain'

937A0110A Moscow MOSCOW NEWS in English
No 13, 26 Mar 93 p 124

[Article by Yelena Dolgikh of the Institute of Employment Problems, Russian Academy of Sciences: "Brain Drain"; first paragraph is MOSCOW NEWS introduction]

[Text] A poll was recently conducted among physicists doing fundamental research in the leading scientific centres of Russia, such as the Institute of General Physics for the Russian Academy of Sciences, the Ioffe Physical Engineering Institute (St. Petersburg), the Budker Institute of Nuclear Physics (Siberian Department of the RAS), the Kurchatov Institute, the Physics Department of Moscow University, and other such centres. A total of 774 respondents were polled.

As is known, physicists have been emigrating en masse for quite some time now. Academician Andreyev believes that about 40 percent of all high-class theoretical physicists and roughly 12 percent of all experimenters have left the former USSR either temporarily or for good.

Still, as the poll shows, the potential of "ain migration" is far from being exhausted. A mere 15.4 percent of all scientists stated firmly that they do not contemplate emigration. Almost the same proportion, 13 percent, are ready to go abroad immediately, at the earliest opportunity. About 40 percent of all respondents do not rule out

a possibility of leaving. Roughly one in every three said he or she never contemplated the idea or does not have a conclusive answer to this question.

Scientists consider work under contract to be the main "channel" or going to a foreign country (90 percent). Fifteen percent of them say they could go to do upgrade or advanced training courses, 20 percent want to leave for good.

Young scientists are keen on emigration. Two-thirds of potential emigrants are under forty, a quarter are under thirty and only 7 percent are older than fifty.

Actually four in every five young scientists under thirty set their sights on emigration. But even among the scientists in the 50-59 age group, approximately a third ponder a possibility of emigrating.

Russians have the highest migration potential: half the contingent would like to try their luck abroad. Quite a few persons of Jewish nationality are set to go (48 percent); among Ukrainians the share of such people is lower (33 percent).

Most of the would-be emigrants fill relatively low positions. About 70 percent of respondents said it is difficult to get a promotion at their institute.

But, significantly, this group of scientists, occupying low rungs in the organizational ladder, are active in creative quests and, more specifically, their scientific papers are published quite frequently here. Ninety-one percent of

them have publications to their credit. Moreover, about 80 percent have had their papers published in foreign periodicals. Approximately one in every three has his or her papers published in foreign periodicals more or less regularly. More than half the publications appear in scientific periodicals in the USA and advanced European countries. But only 4 percent have received royalties in hard currency. More than a third of the potential emigrants (36 percent) believe that the conditions for self-fulfilment are either insufficient or totally lacking in this country.

All respondents contemplating emigration know foreign languages: more than a half have fluent command of one. Interestingly, those knowing three languages are ready to depart "in a body" right away.

Among the factors pushing them out of the country, scientists point up falling living standards (77.7 percent), economic instability (59.9 percent), an abiding sense of insecurity (54.4 percent), political instability (50.5 percent), inadequate material, technical and information backup capabilities for science (4.9 percent). Significantly, having expressed their discontent with the state of affairs in the country, many respondents nevertheless regard with approval of the government's policy. Half the contingent are convinced that the way of economic and political transformations mapped out by the government is the right one, noting at the same time that things in the country today are deteriorating (40-50 percent think so) rather than improving (35-40 percent).

This assessment is quite justified considering the desperate financial plight of many scientists. The average remuneration of a researcher or research associate at the Russian Academy of Sciences is 10 to 30 times less than the average international standards of compensation. Our research has shown, however, that the gap is an order of magnitude greater, almost one hundredfold.

But 6 percent of all respondents said their compensation was "od" [as published]. Many have to do moonlighting. And half the potential emigrants do odd jobs unrelated to science. A significant proportion of young scientists don't see any opportunities for resolving their financial problems here. Physicists are almost unanimous that in this country it is difficult or very difficult to implement or put to work the results of their research efforts (96 percent of all responses).

Among the factors which can induce physicists to stay in the country, they first of all point to proper labour remuneration (23.8 percent of all respondents), then comes elevation of the status of science and sufficient funds for its development (15.8 percent), and further, economic and political stabilization (26 percent of all answers).

Two in three respondents lay great store by the country which sends out an invitation. Precedence is accorded to the USA (80 percent of all respondents), Germany ranks second (40 percent), followed by the United Kingdom (31 percent), France (23 percent), Japan, Canada and

Australia are mentioned less frequently (20, 18, 15 percent respectively). The answers permit conclusions to be drawn about a significant re-orientation in the existing flows of emigration. Thus Israel figured only in 2 percent of the answers. As is known, in the past few years the main flow of emigrants headed for Israel (up to 45 percent of the total) and Germany (42 percent) and, in a less significant measure, to the USA (6 percent). Emigration was originally distinctly "hnic". Before long, however, we believe, there will occur a redistribution of the flows in favour of the USA, Canada, Australia and developed European countries. The proportion of Russians, Ukrainians and Belorussians, whose migration potential is fairly high, will increase in the emigration structure.

Some emigrants are not averse to working in the former socialist countries (15 percent) and even in the CIS republics (4 percent).

The inquiry has thus shown that emigration proclivities are quite widespread among physicists. Active young scientists seek to leave the country, more often than not. Unlike many of those who prefer to stay on, they approve of the market and political reforms unfolding in Russia, so their departure will unquestionably narrow down and, what is worse, impoverish from the intellectual viewpoint, the social base on which the reformers rely.

Western Scientists 'Streaming' to Russian S&T Centers

937A0112A Moscow ROSSIYSKIYE VESTI in Russian
30 Mar 93 p 7

[Article by Andrey Illarionov: "...While Western Researchers Are Striving To Get Into Russian Science Centers"]

[Text] Novosibirsk—Against the background of the outflow of Russian "brains" to developed countries the counterflow was somehow unnoticed. Siberian science, in particular, is attracting many foreign researchers. Annually hundreds of scientists, citizens of those most developed Western countries, strive to get into the creative collectives of institutes of the Siberian Department of the Russian Academy of Sciences. About 15 international scientific centers, which operate on the vast territory from Tyumen to Yakutsk, have been established with their participation.

Together with Russians foreign scientists are studying such problems, which are disturbing mankind, as the activity of tectonics and natural catastrophes, solar-earth physics, the ecology of boreal (circumpolar) forests and closed ecological systems, which were developed by man for survival beyond the earth's biosphere, as well as a number of other ones, which, though not so effective, are no less interesting.

Particular interest has been displayed abroad in unique natural complexes, which open a little the door to the

mysteries of nature or the world of man. Among them is Lake Baykal—living geology, when before the eyes of astounded Siberians 30 square km of dry land are disappearing under water as a result of an earthquake. This is also the amazing world of endemic plants and animals, which have adapted themselves to a full-fledged life in perpetually cold clear waters. A world which provides an example of the possibilities of life "in the northern regions."

A well-trodden route of international expeditions is Gornyy Altay, one of the recognized centers of the world diversity of soils, the plant and animal world, which since distant antiquity has been spiritualized by the presence of man, who left here traces of the amazing diversity of successive civilizations.

But here is the problem. No matter to what tempting discoveries scientific research leads, it cannot be carried out on enthusiasm alone. Especially in a country, where a scientist, when setting off on an expedition, takes into account every liter of gasoline, while a helicopter is becoming an inaccessible luxury. And the very idea of the participation of foreign colleagues to the extent that they can in the reimbursement of the costs does not raise objections.

Another matter is the method of compensation. The Baykal International Center of Ecological Research, for example, has established a kind of tariff—\$1,500 a month from a foreign researcher. At the exchange rate of the ruble the sum is an enormous one. But if a Siberian happens to set off, say, for data processing to America, it will turn out that these \$1,500 will be enough for only three days.

But it is also not worth overestimating the financial capabilities of foreign colleagues. When one of the institutes suggested to a prominent American scientist that he pay \$40,000 into the joint research fund, he implored: Where, he said, am I to get such money? Although the sum is less than the modest annual wage of an American specialist. But vigorous multipurpose monitoring is needed in order to study thoroughly the same internal relations and factors of development of the ecological system of Lake Baykal or the Altay. That is, an automated system of observations and data processing, which can cost tens and hundreds of millions of dollars. For the present, as researchers themselves admit, the Lake Baykal monitoring system is disjointed and is based on technically outdated equipment. In the Altay there is no such system.

Scant financing is holding back many international projects. There is no need to say, for example, how important it is to acclimatize and to learn to breed in the cages of the Cherginskiy Experimental Farm a rare bird of high mountains—the Altay ular. But given the meager funds only an indirect approach to the problem is possible.

The fact that in this situation the disunity of the efforts of scientific collectives has been allowed, is also causing

bitterness. Thus, in the region of Mount Belukha a new preserve is being established. Meanwhile the existing one—the Altay (Priteletskiy, Prichulyshmanskii)—which is already over 60 years old, is in a difficult material and financial position. The Siberian Department does not care about that, since it is the preserve of another department, it does not belong to the Academy of Sciences. But even the largest preserve will not solve completely the problem of preserving the populations of disappearing animals, such as the Altay wild sheep, the snow leopard, and many others. This goal is achievable only in case of the pooling of scientific and state efforts on the entire area of Gornyy Altay. For example, it could be solved with the organization of the Altay-Himalaya joint international scientific center and, in particular, for the comparison of global changes of the biosphere.

This question, which was posed several years ago, is being stubbornly glossed over. Most likely due to the financial difficulties of Russia and India. But both the Himalayas and the Altay are unique natural complexes of planetary importance. And in the interests of the preservation of the biosphere of the planet wealthy countries could give the scientists, who are working on this problem, what financial support they can. In the opinion of specialists, this problem is so important that when working on it there should be no place for false hardship. Since it is a matter of the survival of the planet, this matter is an international one.

Academician Discusses Positive Aspects of 'Brain Drain'

937A0118B Moscow IZVESTIYA in Russian 5 May 93 p 5

[Stateside interview with Aleksey Abrikosov, by Sergey Leskov; "Academician Abrikosov Finds Pluses in...the 'Brain Drain' to the West"; first paragraph is source introduction; last paragraph is editorial comment]

[Text] The name of Aleksey Abrikosov—an active member of the USSR Academy of Sciences who works in theoretical physics—is renowned in the world of science. That scientist became a corresponding member of the USSR Academy of Sciences in 1964 at an age when many are still dreaming of getting a candidate of sciences degree. In 1989, Aleksey Abrikosov became one of the first democratically elected directors in the Academy of Sciences system, and he headed the prestigious Institute of High Pressures in Troitsk, near Moscow. In early 1991, A. Abrikosov became head of a theoretical group at the National Argonne Laboratory in the United States. Since that time, the scientist has not once visited his homeland alone.

Leskov: It's generally acknowledged that the "brain drain" from Russia is one of the most painful problems facing our science. But we're looking at the problem from our end, the Russian side. How is the brain drain viewed

from the other end of the flow, and generally speaking, do you often run into fellow countrymen in Western laboratories?

Abrikosov: It has always been difficult for a scientist to find permanent work in the West. Today, the problem is being aggravated by the end of the "Cold War" and by the dramatic cutbacks in military orders. Most of the Russian scientists who have moved to the West have temporary work. Like gypsies, they roam from science laboratory to science laboratory in various countries with one sine qua non—to skirt a "particular" point, which happens to be Russia and the other states of the former USSR. They also prefer not to visit home, out of fear of the crime that is beginning to appear this very minute in Sheremetyevo.

For example, in my theoretical group, seven associates have permanent work. The same number of associates have temporary work, and five of them came from Russia. Right now, as the director, I am looking for an opportunity to find a vacancy for the Russian Academy of Sciences academician, Anatoliy Larkin.

Leskov: What are the main differences between the work of a scientist in the United States and that in the former USSR?

Abrikosov: Primarily, the computer hardware. Absolutely every scientist in America has a computer, and all the personal computers are linked to a single network that is often national. Usually, a researcher even has a computer at home, too. The computers vary—from primitive ones to powerful work stations. But you don't encounter obsolete systems. For example, the Cray computer, which was impossible to get in the USSR, is considered old hat here.

Second, a similarly substantial difference exists in the powerful experimental base. When I was a director [of a USSR institute], I practically beat my brains out in fruitless attempts to get a high-resolution electron microscope, and even our military clients couldn't help. In the United States, I've never even once run into that kind of problem.

In the business context, Western specialists differ in that they are efficient about keeping promises, something that getting accustomed to is, for us, much more difficult than mastering a computer.

Leskov: Doesn't that first difference in scientific equipment have an effect on the qualifications of the scientists who are seeking their fortune in the West?

Abrikosov: It can't help but have an effect. It's no accident that for someone who was involved with an experimental base in Russia, it's considerably more difficult to find himself in the West. Speaking for my theoretician colleagues, I can say definitely that they are in no way inferior to Western specialists. And it's not surprising that today virtually the entire elite in the area of theoretical physics has left Russia.

Take just the best Russian centers—the Landau Institute of Theoretical Physics and the Leningrad Ioffe Physical Technical Institute. Sometimes in the American or German laboratories, I feel like I've walked into the science council for one of those institutes.

Leskov: The science secretary of the Russian Academy of Sciences, Academician I. Makarov, said recently that if you were to assemble the two best national teams in basic science, they would be under the Russian and American flags. The advances of basic science were also noted at the last annual meeting of the Academy. At the institutes you named, dissertations are being defended on a regular basis, and some fine reports are being published. Aren't you exaggerating things?

Abrikosov: We're used to thinking in quantitative terms. Since the 1930s, our science institutes have been created on the principle of the anthill—the more people you gather, it was thought, the higher the efficiency. But I don't believe in anthills. All it takes is for a few of the best minds to leave a group, and outstanding results become an unachievable dream. As for the evaluation that the leaders of our Academy give of themselves, well, I still have some very unpleasant memories of the morals in that citadel of science.

Leskov: What do our Western colleagues think of Russian scientists? Don't they give those of our countrymen who apply for certain vacancies a hostile reception?

Abrikosov: No. I've never once encountered any prejudice. The United States is a country of emigrants. You'll seldom meet a person here whose grandfather settled in America; more often his father did. In America, it's felt that fresh blood makes the nation healthier. By the way, in the science community, most of the emigrants are from China.

Leskov: Do our specialists dream of coming home? On more than one occasion I've heard the opinion that there's nothing odd about the brain drain. In hard times, they say, our scientists work for a while in the West, preserving their credentials, but later they will be drawn back home.

Abrikosov: Nobody ever shared such plans with me. Just the opposite: people are constantly coming to me, asking me to help them find work. And I'm always hearing sighs from colleagues stuck at home: "What an ignoramus I was, they say—I was offered a contract several years ago, and I didn't take it." What kind of nostalgia can you talk about seriously when, today, nobody needs science in Russia. Basic science doesn't bring any quick revenues, and it takes budgetary financing, and there's no money in the treasury.

As for me personally, in Russia I was simply starved for science. I now work in an American science laboratory with total self-reward, and I'm experiencing that long forgotten feeling of creative satisfaction. I needed to find time to do what I could, but that wasn't possible at home. I'm already over 60, and there's only a little time left for

me to complete my work, and, in light of that, I don't think I'll ever go back to Russia. It won't be possible any time soon in that country to be involved in science.

I'm not alone in such feelings. When I was in Moscow, I remember, more often than not we used to run into Roald Sagdeyev and Yasha Sinay, remarkable scientists, in the foodstore lines. Both of them, by the way, also work in the United States now and aren't thinking about returning. I recently spoke with our corresponding member Yuriy Orlov, who, unlike me, always had a serious interest in politics. But even he admitted that he is seriously considering taking American citizenship. Let's be honest, good-quality food very much facilitates one's health, work, and good disposition. I don't want to lose the daily human conveniences. Believe me, even I, an academician and the son of an academician, had to come to America before I understood that a scientist's mind can be occupied with science only.

Leskov: Today, a lot of plans are coming out about saving Russian science, including plans that involve the participation of various Western funds and the setting up of international science centers in Russia. Which of the projects seems to you preferable?

Abrikosov: I feel certain that to be helping science there, in Russia, is senseless. You can raise the scientists' wages, but you can't bring in the instruments and equipment. Today, there can be only one recipe for saving Russian science: help all the talented scientists to leave Russia sooner, and forget the rest of them. Maybe you think I'm being too harsh. A lot of people disagree with me. But life is showing me to be right. Not a single joint international project has come off successfully. Conversely, as soon as the possibility presents itself, every Russian scientist is leaving the country.

And that's better for Russia. The Chinese scientists who have become Nobel laureates in the United States are now, with the improvement of economic conditions at home, doing a great deal for the flourishing of Chinese science. Of course, they're not moving back to China.

Leskov: Is it really true that after living almost your whole life in Russia, you have divorced yourself once and for all from the problems the country is immersed in? Has the possibility of completing your work in science really left you with no desire to look back at Russia? And is it really true that our endless misfortunes and cataclysms don't even touch your soul anymore?

Abrikosov: I could never forget my country. Every day, I get a collection of the news of the events in Russia that runs 14 pages. I've begun to doubt the sincerity of the Russian politicians. I think they just want to snatch a little more power for themselves. The Democrats, in my opinion, are disoriented and are losing their unity. I don't think Thermidor is going to pass Russia by. As for Western aid, as long as Russia has no laws guaranteeing private capital, no serious businessman is going to invest money in Russia. The events in Russia are producing a general impression that is completely hopeless.

The laboratory attendant peeked into the room and mentioned that it was already late—five o'clock in the afternoon. "It's not customary to dally here at work," Abrikosov explained, and, kicking off his house slippers, he began to feel around under the table for his boots. "A lot of people in Russia are definitely not going to like your remarks," I said to the scientist as we parted. "You'll probably object to their being published." "Why should I?" the Russian academician said with surprise. "When I gave an interview to the Washington Post, it helped me get my first loan from the bank. Publicity is a great thing! And as for science in Russia, I'm being truthful: nothing is going to change there before I die. And I'm not going back anymore."

In publishing the interview our correspondent took from Academician Abrikosov, we understand that very few readers will agree with the ideas he put forth, especially with the conclusion that the salvation of Russian science will consist in, as it were, the mass exodus from Russia of its most talented scientists. We feel that, in this case, we are dealing with a point of view that, although not devoid of interest, is nevertheless extreme.

Ukrainian Organization Hopes To Protect Intellectual Property Rights

937A0120A Moscow VEK in Russian
No 18, 14-21 May 93 p 2

[Article by Dmitriy Bondar, DELOVOY MIR AGENCY, under the rubric "Business Card": "It Is Not That Easy To Steal a Ukrainian Idea!"]

[Text] Kiev—In the former USSR intellectual property as such did not exist. Ukraine, after becoming an independent state, passed a law on such property, which now is a commodity and, thus, also needs legal protection.

There is, naturally, a sea of problems. The law so far protects inventions, industrial designs, and trademarks. But what is to be done with ideas in the area of management, literature, and art? There are many talented people, to whom excellent ideas occur, but due to the lack of experience or education and the inability to complete what has been started practical ideas are being wasted.

But how they are stealing ideas! The author at first wants to share his discovery with someone and to satisfy himself of the correctness of the chosen path, but he does not have time to blink an eye before resourceful operators are appropriating his creation.

How is one to find the authors of valuable ideas, to support them legally and materially, to make an examination and to give advice, to help in the implementation of an idea—from the making of drawings and the development of technological processes to the placing of an order at enterprises? The Ukrainian Fund for the Stimulation of Mass Creativity (UFAMT)—according to the claim of its president, Nikolay Yermoshenko, a public organization, of which there are no analogs anywhere in the world—decided to undertake this.

The group of enthusiasts gathered under the roof of the Ukrainian Institute of Scientific, Technical, and Economic Information. First of all they developed a system of the gathering and stimulation of new ideas.

"We decided not to reject a single idea," says Doctor of Economic Sciences Georgiy Kalitich, vice president of UFAMT. "There always were and are ideas that are not comprehensible to contemporaries. It is nothing terrible, let them lie for a while until mankind is able to appreciate them."

Every idea goes through a three-stage evaluation. The journal AUKTSION IDEY, which is published by the fund, publishes a list of them; therefore, any man "on the street" can speak out both in favor of and against a given proposal. The second filter is the evaluation. And finally there is the public technical council, which has been organized in the form of legal proceedings, in which judges, lawyers, and witnesses take part.

The fund formulated and submitted for the approval of the Ministry of Justice of Ukraine a procedure of the

registration of intellectual property. The preliminary copyright is protected by an author's certificate of UFAMT, while the patent of the fund specifies the protection of copyrights and property rights in accordance with prevailing legislation.

How does the registration of an idea take place? It is necessary to submit to the fund only two notarized documents—an application (the name of the idea, the author, the address) and a description of the idea with an abstract. For registration it is necessary to pay 500 coupons. Children, students, undergraduates, the disabled, as well as the authors of ideas, who transfer them to the ownership of UFAMT, are exempt from payment. The author can become a member of the fund, then this fee is regarded as an initiation fee. Any organization, for which the initiation fee is 15,000 rubles, can also become a member of UFAMT.

Petr Marchenko, chief specialist of the executive board of the fund, showed us a thick folder of contracts with entrepreneurial structures, which are well known in Ukraine and among which are such ones as the Intelinvest Joint Stock Company, the Ukrainian National Innovation Fund, and others. They are gladly using ideas that have been registered by UFAMT. In practice the authors conduct negotiations with businessmen at the intellectual club that was established by the fund in the capital. They feel confident, for they are selling a commodity that is legally protected.

Of course, the fund for the stimulation of mass creativity could not subsist only on the registration payments for ideas. Collective members—powerful entrepreneurial structures—are financing it, the republic State Committee for Science is also supporting it. Owing to this UFAMT has already today 18 regional branches at sectorial territorial information centers. While the principles, which it made the basis for the registration of intellectual property, have interested UNESCO.

Several ideas, which have been registered by UFAMT, are:

1. The use in magnetohydrodynamic generators of organic polar solvents instead of high-temperature plasma.
2. A method of verifying the second law of thermodynamics.
3. The sports game of spontaneous soccer.
4. Universal privatization.
5. The decontamination of the heat and power components of nuclear reactors.

The contact telephone numbers of UFAMT are: (044) 268-25-16, 269-20-75, fax number: (044) 268-25-41.

Russian Council of Ministers Decree on Information Resources

937A0122A Moscow ROSSIYSKIYE VESTI in Russian
8 Jun 93 p 4

[Decree No. 505 of the Council of Ministers-Government of the Russian Federation of 30 May 1993, "On the Approval of the Statute on the Russian Association of Information Resources of Scientific and Technical Development Attached to the Council of Ministers-Government of the Russian Federation" and the Statute on the Russian Association of Information Resources of Scientific and Technical Development Attached to the Council of Ministers-Government of the Russian Federation]

[Text] On the Approval of the Statute on the Russian Association of Information Resources of Scientific and Technical Development Attached to the Council of Ministers-Government of the Russian Federation

The Council of Ministers-Government of the Russian Federation resolves:

To approve the Statute on the Russian Association of Information Resources of Scientific and Technical Development Attached to the Council of Ministers-Government of the Russian Federation.

[Signed] Chairman of the Council of Ministers-Government of the Russian Federation V. Chernomyrdin

The Statute on the Russian Association of Information Resources of Scientific and Technical Development Attached to the Council of Ministers-Government of the Russian Federation

1. The Russian Association of Information Resources of Scientific and Technical Development Attached to the Council of Ministers-Government of the Russian Federation (hereinafter called the Association) is a unified state information technology complex, which consists of a head organization with the same name, interbranch territorial scientific and technical information centers (hereinafter called TsNTIs), and other organizations in accordance with the appendix.

The list of organizations, which belong to the Association, is specified by the Council of Ministers-Government of the Russian Federation.

2. The basic tasks of the Association are:

the formation, distribution, and use on the territory of the Russian Federation of state resources of scientific and technical information, the establishment and development of automated systems of the processing and transmission of this information;

the preparation of information materials and data on the scientific and technical and socioeconomic development of the country for the Council of Ministers-Government of the Russian Federation;

the making of information products and services available to enterprises, organizations, and other managing subjects, as well as individual citizens on a contractual basis.

3. For the purposes of fulfilling the basic tasks the Association:

forms, carries out the distribution, and ensures the use of state resources of scientific and technical information, including territorial collections of scientific and technical literature and documents, as well as ensures the establishment and development of automated systems of the processing and transmission of this information;

carries out the selection, analysis, and generalization of the data on the scientific and technical and socioeconomic development of the country for the Council of Ministers-Government of the Russian Federation;

promotes the introduction in the practice of database organization and management on the territory of the Russian Federation of new information technologies and services;

carries out in accordance with established procedure cooperation with foreign organizations on questions of the transmission, exchange, and purchase of information.

4. The property of the Association, which consists of fixed and working capital, is federal property and is under its day-to-day management.

The financing of the activity of the Association is carried out both by means of assets of the republic budget of the Russian Federation and by means of assets of the enterprises, organizations, and other managing subjects, which are interested in obtaining the scientific and technical information and services, which are made available by the Association.

The Association in accordance with prevailing legislation disposes of the revenues from the activity on the rendering of paid services, channeling them into the development of the technical base and the accomplishment of tasks that are specified by the Council of Ministers-Government of the Russian Federation.

The Association is a legal person and has a current account and other accounts at institutions of banks and a seal with a picture of the State Emblem of the Russian Federation and with its name.

5. The head organization of the Association—Rosinformresurs [the Republic Association of Information Resources of Scientific and Technical Development of Russia] (Moscow)—in accordance with the tasks assigned to the Association:

coordinates the activity of the TsNTIs and other organizations of the Association, formulates programs of the improvement and development of this system;

organizes the retraining and advanced training of database organization and management specialists of the national economy;

finances the work on the formation and the organization of the use of state resources of scientific and technical information, the establishment of databases and data banks, and the selection, analysis, and generalization of information for the Council of Ministers-Government of the Russian Federation;

performs the functions of a state client and ensures the examination and approval in accordance with established procedure of the technical and economic substantiations and the designs for the construction of facilities that are a part of the Association;

carries out the monitoring of the distribution and use of the centralized capital investments that have been allocated for the development of the infrastructure and social sphere of the Association; in accordance with established procedure carries out the writing off of equipment and other fixed capital;

considers in accordance with established procedure the proposals of the organizations, which are a part of the Association, on the sale or leasing in accordance with prevailing legislation of the property that is on their balance sheet.

6. The Association uses a wage system in accordance with the Uniform Wage Scale for the Remuneration of the Labor of Workers of the Budget Sphere.

7. The general director, who by virtue of his position is simultaneously the director of the head organization of the Association, who is appointed to the position and is relieved of the position by the Council of Ministers-Government of the Russian Federation, carries out the supervision of the activity of the Association.

The general director of the association, who is the director of Rosinformresurs (Moscow), in accordance with established procedure approves the structure and manning table of the head organization.

8. The general director of the Association:

acts without power of attorney on behalf of the Association, represents its interests, disposes in accordance with prevailing legislation of its property and assets, concludes contracts, including labor contracts, establishes temporary creative collectives, issues powers of attorney, appoints to a position and relieves of a position the managers of the organizations, which are a part of the Association, and opens a current account and other accounts at banks;

within his competence issues orders and instructions, issues directives, which are mandatory for the officials and the organizations, which are a part of the Association, and verifies their execution.

9. The board of directors, which examines at regularly held meetings basic questions of the activity of the Association and its organizations, acts in the Association as a consultative body. The general director of the Association supervises the work of the board of directors. The recommendations of

the board of directors are implemented by orders of the general director of the Association.

10. The rights and duties of the organizations of the Association with regard to the use of the common information retrieval systems and information files are specified by the general director of the Association in consultation with the board of directors.

11. The organizations, which are a part of the Association, are legal persons, have a current account and other accounts at institutions of banks, a seal with a picture of the State Emblem of the Russian Federation and with their name, and an independent balance sheet and carry out their activity in accordance with the legislation of the Russian Federation, this Statute, and the charters of the organizations, which are approved by the general director of the Association.

12. The association carries out its activity on the basis of planning.

The assignments of the Council of Ministers-Government of the Russian Federation and the orders of central bodies of federal executive power are fulfilled on a priority basis.

13. The Association conducts records management and accounting and submits in accordance with established procedure returns both on the organizations and on the Association as a whole.

14. The checking and auditing of the financial and economic activity of the Association and its organizations are carried out in accordance with established procedure.

15. The reorganization and elimination of the Association are carried out by a decision of the Council of Ministers-Government of the Russian Federation.

Approved by Decree No. 505 of the Council of Ministers-Government of the Russian Federation of 30 May 1993.

Appendix to the Statute on the Russian Association of Information Resources of Scientific and Technical Development Attached to the Council of Ministers-Government of the Russian Federation

List of the Scientific and Technical Information Centers (TsNTIs) and Other Organizations, Which are a Part of the Russian Association of Information Resources of Scientific and Technical Development Attached to the Council of Ministers-Government of the Russian Federation

Rosinformresurs (the head organization), 103074, Moscow, Slavyanskaya Ploshchad, 4

Altay TsNTI, 656099, Barnaul, Prospekt Lenina, 94

Amur TsNTI, 675000, Blagoveshchensk (Oblast), Ulitsa B. Khmel'nitskogo, 10

Arkhangelsk TsNTI, 163061, Arkhangelsk, Ulitsa Loginova, 17

- Astrakhan TsNTI, 414000, Astrakhan, Ulitsa Chalabyana, 16/11
- Bashkir TsNTI, 450025, Ufa, Ulitsa Kirova, 15
- Belgorod TsNTI, 308800, Belgorod, Ulitsa Kommunisticheskaya, 82
- Bryansk TsNTI, 241000, Bryansk, Ulitsa Gorkogo, 30
- Buryat TsNTI, 670000, Ulan-Ude, Ulitsa Yerbanova, 7
- Vladimir TsNTI, 600029, Vladimir, Oktyabrskiy Prospekt, 47
- Volgograd TsNTI, 400064, Volgograd, Prospekt imeni V.I. Lenina, 78
- Vologda TsNTI, 160600, Vologda, Ulitsa Mira, 34
- Voronezh TsNTI, 394730, Voronezh, Prospekt Revolyutsii, 30
- Dagestan TsNTI, 367000, Makhachkala, Proyezd Kalinina, 68
- Ivanovo TsNTI, 153001, Ivanovo, Ploshchad Revolyutsii, 2
- Irkutsk TsNTI, 664000, Irkutsk, Ulitsa Kommunarov, 10
- Kabardino-Balkar TsNTI, 360004, Nalchik, Ulitsa Nogomova, 62
- Kaliningrad TsNTI, 236040, Kaliningrad (Oblast), Ulitsa Teatralnaya, 34
- Kalmyk TsNTI, 358000, Elista, Ulitsa Lenina, 331
- Kaluga TsNTI, 248630, Kaluga, Saryy torg, 9.
- Kamchatka TsNTI, 683603, Petropavlovsk-Kamchatskiy, Proyezd Karla Marksa, 29
- Karelian TsNTI, 185670, Petrozavodsk, Ulitsa Andropova, 2/24
- Kemerovo TsNTI, 650630, Kemerovo, Ulitsa Sarygina, 29
- Kirov TsNTI, 610601, Kirov, Ulitsa Engelsa, 67
- Komi TsNTI, 167610, Syktyvkar, Ulitsa Pervomayskaya, 78
- Kostroma TsNTI, 156602, Kostroma, Ulitsa Sverdlova, 1
- Krasnodar TsNTI, 350028, Krasnodar, Ulitsa Starokubanskaya, 116-2
- Krasnoyarsk TsNTI, 660017, Krasnoyarsk, Prospekt Mira, 108
- Kurgan TsNTI, 640002, Kurgan, Ulitsa Proletarskaya, 63
- Kursk TsNTI, 305000, Kursk, Ulitsa Dzezinskogo, 50
- Lipetsk TsNTI, 398600, Lipetsk, Prospekt Mira, 33
- Mari TsNTI, 424000, Yoshkar-Ola, Leninskiy Prospekt, 68
- Mordvinian TsNTI, 430001, Saransk, Ulitsa Fedoseyenko, 13
- Moscow City TsNTI, 101958, Moscow, Proyezd Serova, 5
- Moscow Oblast TsNTI, 140012, Lyubertsy of Moscow Oblast, Ulitsa Elektrifikatsii, 26
- Murmansk TsNTI, 183693, Murmansk, Ulitsa Papanina, 4
- Nizhniy Novgorod TsNTI, 603000, Nizhniy Novgorod, Ulitsa Studenaya, 8
- Novgorod TsNTI, 173000, Novgorod, Proyezd Gagarina, 6
- Novosibirsk TsNTI, 630050, Novosibirsk, Krasnyy Prospekt, 82
- Omsk TsNTI, 644010, Omsk, Ulitsa Maslennikova, 2
- Orenburg TsNTI, 460882, Orenburg, Ulitsa Komsomolskaya, 16
- Orel TsNTI, 302026, Orel, Ulitsa Mopra, 24
- Penza TsNTI, 440024, Penza, Ulitsa Ulyanovskaya, 1
- Perm TsNTI, 614600, Perm, Ulitsa Popova, 9
- Martime TsNTI, 690001, Vladivostok, Ulitsa Leninskaya, 115
- Pskov TsNTI, 180729, Pskov, Oktyabrskiy Proyezd, 27
- Rostov TsNTI, 344010, Rostov-on-Don, Budennovskiy Prospekt, 70
- Ryazan TsNTI, 390044, Ryazan, Ulitsa Krupskoy, 17
- Samara TsNTI, 443010, Samara, Ulitsa Kuybysheva, 145
- St. Petersburg TsNTI, 191011, St. Petersburg, Ulitsa Sadovaya, 2
- Saratov TsNTI, 410045, Saratov, Ulitsa Zheleznodorozhanaya, 72
- Sakhalin TsNTI, 693000, Yuzhno-Sakhalinsk, Kommunisticheskiy Proyezd, 31
- Sverdlovsk TsNTI, 620095, Yekaterinburg, Ulitsa Malyshova, 101
- North Osetian TsNTI, 382003, Vladikavkaz, Ulitsa Ardonskaya, 176
- Smolensk TsNTI, 214012, Smolensk, Ulitsa Kirova, 226
- Stavropol TsNTI, 355034, Stavropol, Ulitsa Lenina, 384
- Tambov TsNTI, 392008, Tambov, Ulitsa Sovetskaya, 182
- Tatar TsNTI, 420043, Kazan, Ulitsa Volkova, 79
- Tver TsNTI, 170638, Tver, Ulitsa Vagzhanova, 19
- Tomsk TsNTI, 634009, Tomsk, Ulitsa Dalne-Klyuchevskaya, 4

Tula TsNTI, 300600, Tula, Ulitsa Oruzheynaya, 1a

Tyumen TsNTI, 625009, Tyumen, Ulitsa Profsoy-
uznaya, 88

Udmurt TsNTI, 426057, Izhevsk, Ulitsa Sovetskaya, 13

Ulyanovsk TsNTI, 432700, Ulitsa Goncharova, 48

Khabarovsk TsNTI, 680000, Khabarovsk, Ulitsa Pushkina,
45

Chelyabinsk TsNTI, 454000, Chelyabinsk, Ulitsa Truda,
157

Chita TsNTI, 872078, Chita, Ulitsa Anokhina, 63

Chuvash TsNTI, 428000, Cheboksary, Ulitsa Leningrad-
skaya, 33

Yakutsk TsNTI, 677000, Yakutsk, Ulitsa Ammosova, 12

Yaroslavl TsNTI, 150003, Yaroslavl, Prospekt Lenina, 2a

Institute for the Advanced Training of Information
Workers, 125315, Moscow, Ulitsa Usiyevicha, 22

Russian Patent Chief on Intellectual Property Rights

937A0124A Moscow COMMONWEALTH BUSINESS NEWS in English 12 May 93 p 5

[Article by E. Kramarenko: "Charter of Immunity"]

[Text] The Russian Federation has presently passed a package of laws to protect intellectual property rights. The first question to the General Director of the Association of Patent Attorneys, Mikhail Gorodissky, is about last changes in Russian inventing practices with the passage of the new laws.

If previously the inventor was without any rights, now his intellectual property possesses legal protection. That changes everything. To enter into market relations without a legal protection of intellectual property would be disastrous. The role of the patent agents, the inventors, and the designers at enterprises is sharply growing in the new conditions. The Association of Patent Attorney's role is also growing, and is becoming the protector of the interests of intellectual property owners.

Please, a few words about SOJUZPATENT.

For 30 years of work we took out dozens of thousands of patents in more than 50 countries for developments made by Russian scholars. More than 200 specialists with knowledge of foreign languages and the specific character of work are employed at the Association. Patent Attorney is a specialty of a legal nature. Its professional activity tries, first, to represent the interests of Russian scholars, enterprises and organizations in the protection of their scientific and technical developments both inside and outside of Russia and, second, protect the interests of foreign firms in Russia.

Patent Attorneys can be divided into two groups. The first verifies technical developments and inventions, and the second protects trademarks, industrial designs, and company names. The requirements in this profession are very high. Legal work protecting industry property, engineering knowledge in their field and a knowledge of foreign languages are needed.

Our Association has contacts with 80 countries, does patenting services for both Russian and foreign inventors, registers Russian and foreign trademarks. We offer a wide variety of services—from advice on legislation and the practice of patenting up to the preparation of application documents for patents in Russia and abroad, the registration of trademarks and industrial designs, and help in the implementation of inventions.

For this purpose we advertise and look for partners among foreign companies. We also fulfill requests to

conduct patent state-of-the-market research, conduct thematic patent searches, verify if the work is in the line with patent rules, do inquiries of foreign patenting procedure, search and prepare specifications of inventions absent in Russian patent funds.

And how do you work with clients?

A person has a worthwhile idea, he comes to us and we protect it by a patent. We can conduct patenting abroad. Besides traditional patenting in a country, two widespread types of patenting also exist: the European and PCT (global) procedure. Under European conventions legal protection is guaranteed in 14 European states, and in the second procedure protection is guaranteed in 49 countries.

Fines of one-two million dollars for violating patents are not uncommon in foreign countries.

If I saw LEVIS on my Russian jeans, this is only my concern. But if a cooperative does this with a large amount of jeans, by Russian law, this is an illegal use of another's trademark. The victim may demand the use of civil or legal sanctions, or both, against the violator; the end of the use of another's trademark and compensation, the publication of the legal ruling for restoring their business reputation, stripping the illegal trademark from the goods, and the destruction of the manufactured products. The Hungarian inventor, Mr. Rubik patented his cube wherever he could, including in Russia. The design was published in some magazines, and clever people in Russia started counterfeiting it. Mr. Rubik protested, and the production of counterfeits was stopped. A patent is a charter of immunity for the owner of the invention.

You have a lot of experience in protecting industrial property. What advice would you give inventors and businessmen?

First, if you have a good idea, don't rush to tell the world about it. Get the correct rights for the invention, and only then start advertising. Remember that patenting is a profitable business.

A patent is a product. All operations with this document should be accompanied by cash payments. The patent may be used as a share in the authorized fund of the enterprise and may be bequested. We can compare its reliability only with real estate. Businessmen, investing money in the process of patenting and financing the invention, may become patent holders of commercially promising products.

Remember the Nobel Prize Fund was formed because of profits from Alfred Nobel's patent on dynamite. So don't wait, invest money in promising ideas. They'll pay off.

Reform of Latvian Science Described

937A0114A Moscow *NAUKA I BIZNES* in Russian
No 8, 5 Mar 93 p 11

[Article by Valeriy Kamnev: "What Is the Matter With Science in Latvia?"—first paragraph is *NAUKA I BIZNES* introduction]

[Text] At the beginning of February Doctor of Sociological Sciences Gennadiy Nesvetaylov, an authoritative Belarusian sociologist, published an article entitled "The Reform of Science in Latvia." This very, in our opinion, interesting study was made within the framework of a project supported by the Basic Research Foundation of the Republic of Belarus. We hope that soon it will appear in the electronic journal KURYER RAN I VYSSHEY SHKOLY. We are publishing it in summary form.

Science in Latvia, as everywhere, is by no means flourishing and is suffering from the same defects as here—a shortage of cash, the brain drain, the departure of young people, and others. The number of associates of academic institutions has decreased from 5,000 to 3,500 and continues to decrease. The state budget for 1993 is expected in the range of only 400 million rubles. Specific features—the Latvian Diaspora is helping, the need for scientists to know Latvian is interfering.

And the main thing is that much of what the radical democratic part of our scientific community only dreams about, has in many respects been done there. This has been done for a long time, since 1991, while the reforms of science acquired final legal registration with the approval in late 1992 of the Law on Science.

A "state-public system of the management of science" has been introduced in Latvia. This means that the Latvian Council for Science, which is a collective body that is elected for three years from representatives of the Council of Ministers, the Academy of Sciences, the Union of Scientists, and so on, 28 in number, is the highest one after the Council of Ministers, which approves state scientific policy. In functions the council resembles the former USSR State Committee for Science and Technology, but cannot "limit the rights and the financial competence of the performers of the scientific projects that are financed by it."

Projects are financed exclusively on a competitive basis, which makes expert councils the basic element of the Council for Science. It is interesting that the first personnel of the expert councils were elected by secret ballot by all candidates and doctors of sciences of Latvia. An interesting thing appeared—directors and their deputies made up the majority of members of the expert councils, who were elected in such a democratic manner. "Practical experience showed," Nesvetaylov writes, "that they represented in the expert councils not only and not so much the interests of a field of knowledge as the interests of their organization. Therefore, it is now prohibited by law to elect to expert commissions the executives of scientific institutions and their deputies." The ethical aspect of the matter is also being

particularly observed—now the members of the expert commissions are obliged to sign first the Declaration of Duties and Responsibility.

We will be extremely interested in finding out how the new expert councils will act (the three-year term, to which the old councils were elected, ends soon)—now without authorities and with "the kissing of the cross." But it is already now possible to draw some conclusions. For example, about the comparatively small elimination—in 1991 of 1,000 applications 154 were rejected. But money was scanty, so that, although the issuing of grants to institutions, and not just scientists, was envisaged, in fact this did not happen.

As should have been expected, the competitive system of financing for all its advantages is also not free of drawbacks. The scientists of scientific research institutes got into a disadvantageous position as compared with the representatives of VUZ science. "The remuneration of labor for teaching," it is stated in the article, "according to the line of expenditures 'education' became for VUZ personnel a form of social protection in case of the failure to obtain a grant from the Latvian council for science. The associates of academic institutions, on the contrary, do not have such a 'safety margin' and depend almost entirely on the results of competition.... Grants have greatly helped VUZ collectives, which often are significantly weaker on the scientific level as compared with academic institutes."

The legal status of the Latvian state scientific institution differs greatly from that of the Russian one. It is specified in the Latvian Republic Law on the Nonprofit Organization. A collective body, which is elected by the general meeting of scientists, manages the institution. It, in turn, elects the administration, approves estimates, and so forth. The principle "The administrator is the servant of the Council" is implemented here. Such a system greatly increases the social protection of the researcher—the administration, for example, does not have the right to make decisions that contain an evaluation of scientific research.

The reforms of science in Latvia have greatly undermined the Academy of Sciences. They deprived it of the right to distribute finances, they placed its interrelations with scientific research institutions on a contractual basis, which process proved to be very painful for academicians. First they took from them the increments for an academy title, having compensated for the monetary losses by the lifting of the wage ceiling for scientific workers. But this compensation went to rack and ruin almost immediately, because soon the state system of salaries with fixed rates was introduced for scientific workers. The next misfortune is the reduction to one-fifth of the staff of the presidium of the Academy of Sciences and the decrease of the salaries of the top executives of the academy. The opinion of Academician Ya. Stradyn that the changeover from "institutional" academies to "personal" academies makes them vulnerable and raises the question of their existence in general, though not in the form of legal elimination, but in the form of the discontinuation of financing from the state budget, is cited in the article. "We should do everything that depends on

us," Stradyn believes, "in order to convince our peoples and governments—not by words, but by deeds—that the elite structures of science (science academies) have not exhausted their possibilities, but are of real benefit to society and to the prestige and cultural level of their country."

For the time being the academy exists. The majority of institutes of Latvia are preparing to implement the idea of an association of institutes, which was cherished by the organizers of the Conference of Scientists of the Russian Academy of Sciences—such an association, one must assume, will soon appear under the "personalized" academy. They have already now been faced with the problem of the status of property.

Concluding his study, Gennadiy Nesvetaylov recommends the experience of Latvia "for the borrowing of its positive features and the reduction to a minimum of the costs that are inevitable in case of reforms."

"It seems to me," he writes, "that the following are among the unconditional merits of the Latvian experience: The regulation of the development of science is becoming state-public regulation with the extensive enlistment of the scientific community in the making of decisions on the most urgent question—the financing of research; in the management of science the priority not of the department, but of the scientist or the collective of researchers has been secured legislatively; the prerequisites have been created for the leveling of the departmental barriers between academic, VUZ, and sectorial science; international contacts have been made substantially easier.

"At the same time it has thus far not been possible to solve a large number of complicated problems. Thus, the questions of the interaction of science with the higher school are poorly reflected in the law. There is no scientifically substantiated procedure of the distribution of financial assets...among individual consolidated groups of fields of sciences (physics, chemistry, and so on). The democratic mechanism of the competitive selection of applications comes into play only within each of these groups. The defense of dissertations should take place in Latvian, which prevents the manning of special councils with experts from outside Latvia and influences the scientific level of the discussion of dissertations. The absence of a price limit in the payment for the infrastructure is having the result that only a small part of the competitive financing is being used for the wage of scientists."

Changes in Science Academies in Former Soviet Union

937A0114B Moscow IZVESTIYA in Russian
17 Apr 93 p 15

[Article by an IZVESTIYA correspondent: "Who Is Who at the Academies of Sciences of the Former Republics of the USSR"—first paragraph is IZVESTIYA introduction]

[Text] Such a question as applied to the academy presidents of the now sovereign states interests many readers.

From Yerevan there has come the report that the latest of the repeated resignation requests of Viktor Ambartsumyan has been complied with, and on 8 April the election of a new president of the Academy of Sciences of Armenia was held. Academician Fadey Sarkisyan, who at one time headed the Yerevan Scientific Research Institute of Mathematical Machines and then was chairman of the Council of Ministers of the Armenian SSR, became him. While congratulating the new president on his victory in the alternative, six-candidate election, it is impossible still not to hold back the sorrow with regard to the resignation of Viktor Amasovovich. For the distinguished scientist and citizen of Armenia, the Union, and the world, who had headed the academy since 1947, was, according to universal opinion, in his proper place. Thanks to him for everything!

Now Boris Paton is the oldest among the heads of the academies of the states that belonged earlier to the USSR (in the "length" of tenure in the post of president). On 24 March he was reelected president of the Academy of Sciences of Ukraine.

In Kyrgyzstan the president of the academy has become the head of state. A sacred place is never empty. Now the younger brother of Chingiz Aytmatov, Ilgiz—a specialist in mining sciences—has occupied it.

Vladimir Platonov, former president of the Belarusian Academy of Sciences, is on a long-term business trip in the United States. He is giving a series of lectures. He is preparing a book for publication. The rumors that he intends to change his homeland are exaggerated. Platonov remains a citizen of the Republic of Belarus and, according to reliable sources, soon is returning to his homeland. In 1992 Leonid Sushchenya, a well-known biologist, was elected president of the Academy of Sciences of Belarus.

Naturally, all the presidents are academicians of their national academies. Except for the new president of the Academy of Sciences of Turkmenistan. Since 2 March Doctor of Technical Sciences Aga Khodzhamamedov, in the recent past the director of the academy's Institute of Chemistry, has been him.

In nine of the new sovereign states, which were union republics, the presidents of the academies of sciences remained the same ones as at the moment of the dismantling of the USSR: Azerbaijan—Eldar Salayev (semiconductor physics), Georgia—Albert Tavkhelidze (nuclear physics), Latvia—Janis Lielpeter (magnetic hydrodynamics), Lithuania—Benedikt Juodka (physical chemical biology), Moldova—Andrey Andriyesh (semiconductor and dielectric physics), Kazakhstan—Umirzak Sultan-Gazin (mathematics), Tajikistan—Sabit Nigmatullayev (seismology), Uzbekistan—Makhmud Salakhitdinov (mathematics), Estonia—Arno Keerna (economics).

The Russian Academy of Sciences was born, rather, was revived at the very end of the road for the Soviet Union. On 17 December 1991 Yuriy Osipov was elected its first president in an alternative election by 824 out of 963 votes.

Charter of the Russian Academy of Sciences

937A0113A Moscow POISK in Russian
No 2 (192), 8-14 Jan 93 pp 4-5

[Charter of the Russian Academy of Sciences, adopted by the General Meeting of the Russian Academy of Sciences on 23 December 1992]

[Text] I. General Provisions

1. The Russian Academy of Sciences (RAS) is an all-Russian self-administered organization. In its activity the RAS is guided by the legislation of the Russian Federation and its own charter, which is adopted by the general meeting of the RAS.

The Russian Academy of Sciences is the highest scientific institution of Russia.

The Russian Academy of Sciences unites the members of the RAS—full members and corresponding members, who are elected by the general meeting of the RAS, and the scientific associates of the institutions of the RAS.

2. The basic tasks of the Russian Academy of Sciences are:

the conducting of basic research in the area of the natural sciences, the technical sciences, the humanities, and the social sciences, which contributes to the economic, social, and spiritual development of society;

the utmost support of the development of science in Russia;

the conducting of research which promotes the preservation and development of national cultures and the harmonization of interethnic relations;

the performance of applied work in the interests of Russia, its national formations and regions;

the integration of academic, VUZ, and sectorial science of Russia for the purpose of the utmost development and effective strengthening of the cooperation between science, education, and culture and the implementation on the territory of Russia of a unified scientific and technical policy;

participation in the elaboration of state decisions on questions of scientific and technical progress, in the formulation and examination of major scientific and technical programs of the economic and social development of Russia and the republics, krais, and oblasts, which are a part of it, and programs of the improvement of the environment;

the promotion of the formation and development of science-intensive sectors of the economy of Russia;

the promotion of the formation of the conditions for the revelation of the creative potential of all scientists of

Russia on the basis of democratic forms of competition and contention, which exclude the possibility of monopolization in science;

the identification and support of talented researchers, the aiding of the creative growth of young people;

the increase of the authority of knowledge and science, the status and social protection of scientific workers.

3. The Russian Academy of Sciences carries out the coordination and overall scientific supervision of the basic research on the most important problems of the natural sciences, the technical sciences, the humanities, and the social sciences, which is being performed by scientific institutions and higher educational institutions of Russia, which are financed from the state budget.

4. For the accomplishment of its tasks the Russian Academy of Sciences:

specifies the basic directions of basic research in the natural sciences, the technical sciences, the humanities, and the social sciences;

singles out the directions of basic research, in which the pooling of the efforts of academic, VUZ, and sectorial scientific subdivisions can ensure the rapid achievement of fundamentally new results in the area of science, engineering, and technology, forms temporary interdepartmental collectives of researchers, and allocates the necessary resources for the performance of the work;

participates jointly with higher educational institutions of Russia in the establishment of scientific educational complexes on the basis of institutes of the RAS and educational institutions;

identifies and supports (in particular, through the system of grants) scientific collectives and individual researchers, who have proven themselves through high work efficiency;

announces and conducts competitions on the solution of scientific problems, which are important for the economy of Russia, and in necessary cases forms the corresponding special-purpose collectives of researchers;

draws up jointly with state bodies recommendations on the effective use of scientific and technical achievements in the economic and social development of Russia;

prepares for the highest state bodies of Russia proposals on the development of the material and social base and the increase of the level of the personnel potential of academic, VUZ, and sectorial science of Russia;

participates in the development of the strategy and tactics of nature conservation policy on the territory of Russia;

promotes the development of the extensive international cooperation of scientists of Russia by the conclusion of agreements with the academies of sciences and other research organizations of foreign countries, establishes

in Russia international research centers, and conducts international congresses, conferences, and seminars;

convenes scientific sessions, conferences, and meetings for the discussion of scientific and applied problems, questions of the coordination of scientific research and design work, and problems of the development of productive forces, culture, and nature conservation activity on the territory of Russia;

carries out publishing activity: publishes scientific journals and works of scientific institutions, in which the results of the scientific research, which is being conducted at the RAS and other scientific institutions, are published, covers in these or special publications the activity of the RAS and the problems of scientific and technical progress and the cultural development of Russia, and is the founder of academic scientific journals;

carries out the library information support of scientific research, promotes the development on the territory of Russia of scientific information networks;

aids the promotion and spreading of scientific knowledge;

awards for outstanding scientific achievements and scientific and technical achievements medals and prizes, including ones named after prominent scientists.

5. The Russian Academy of Sciences is organized according to the scientific field and territorial principles. It has within it departments in fields and directions of science (departments), regional departments, and regional scientific centers (appendix).

The members of the Russian Academy of Sciences, who are united by the regional departments, simultaneously belong to the departments in their specialty.

6. The Russian Academy of Sciences has scientific centers, scientific research institutes, laboratories, observatories, stations, botanical gardens, libraries, publishing houses, archives, museums, scientific research expeditions, and other scientific and auxiliary scientific institutions, enterprises, and organizations.

Scientific societies, scientific councils, committees, and commissions, which are organized in accordance with the procedure that is established by the presidium of the RAS, are under the Russian Academy of Sciences.

The Russian Academy of Sciences participates in accordance with agreements with foreign scientific institutions in the establishment of international scientific institutions and organizations and joins international organizations.

7. For the support of the scientific activity of the Russian Academy of Sciences, its institutions, organizations, and enterprises the Academy of Sciences owns building, structures, ships of the scientific research fleet, equipment, instruments, vehicles, means of communication, and other property, as well as property that ensures the development of the RAS and the meeting of the social

needs of the personnel of the academy (housing, polyclinics, hospitals, sanatoriums, vacation homes, vacation hotels, hotels, and others).

All questions of the possession, use, and disposal of the property of the Russian Academy of Sciences are governed by prevailing legislation and the Statute on the Legal Regime of the Property of the RAS, which is approved by the general meeting of the RAS.

8. The assets of the state budget of Russia are the basic source of the financing of the activity of the Russian Academy of Sciences.

Assets from state scientific research funds, public and private foundations, as well as assets, which are obtained from agreements, arrangements, and contracts with interested clients of Russia and other states, can serve as additional sources of financing.

The RAS is a noncommercial organization.

9. The Russian Academy of Sciences has the status of a legal person.

II. The Members of the Russian Academy of Sciences and Foreign Members of the Russian Academy of Sciences

10. Scientists, who have enriched science with works of paramount scientific importance, are elected full members of the Russian Academy of Sciences.

Scientists, who have enriched science with works of outstanding scientific importance, are elected corresponding members of the Russian Academy of Sciences.

The members of the RAS are elected for life.

11. The total number of members of the Russian Academy of Sciences is specified by the general meeting of the RAS.

12. The Russian Academy of Sciences can elect foreign members of the RAS. The rights of foreign members are specified by the general meeting of the RAS.

13. The elections to the Russian Academy of Sciences are held in accordance with this charter and the Statute on Elections, which is approved by the presidium of the RAS.

III. The Procedure of the Election of Members of the Russian Academy of Sciences

14. The election of full members and corresponding members of the RAS is held no less often than once every three years.

The time of the holding of the election, the name of the specialties, and the number of vacancies in each specialty are established by the presidium of the RAS with allowance for the representations of the departments and the regional departments.

15. The announcement of the presidium of the RAS on the holding of the election is published in the central

press no later than four months before the holding of the election. A change of the names of the specialties, their breakdown by departments, and the number of vacancies in each specialty is not permitted after the publication of the announcement on the holding of the election.

The right to nominate candidates for full members and corresponding members of the Russian Academy of Sciences is granted to members of the RAS, scientific institutions, higher educational institutions, and scientific councils. The nomination of candidates by institutions and organizations is carried out at meetings of scientists and scientific and technical councils, collegiums, or presidiums by secret ballot by a simple majority vote.

The names of the candidates for full members and corresponding members of the RAS with the corresponding justification are reported in writing to the Russian Academy of Sciences within 45 days from the day of the publication of the announcement on the election.

The names of the nominated and registered candidates are published no later than two months before the election. The results of the election are published in the central press.

16. The election of full members and corresponding members of the Russian Academy of Sciences is carried out by the general meeting of the RAS from among the candidates who were elected by the general meetings of the departments.

17. During the election of candidates for full members of the RAS at the general meeting of the department the full members of the RAS, who belong to the given department, have the right to vote.

During the election of candidates for corresponding members of the RAS at the general meeting of the department the full members and corresponding members of the RAS, who belong to the given department, have the right to vote.

18. The elections of candidates for full members and corresponding members of the RAS are conducted at the general meetings of the departments by secret ballot.

The number of candidates for full members and corresponding members of the RAS, who have been elected by the general meeting of the department, should not exceed the number of corresponding vacancies in the given specialty.

19. The people, who received the largest number of votes (with allowance made for voting by rounds), but not less than two-thirds of the votes of the full members of the RAS for the given department, who took part in the voting, and not less than one-half of the registered complement of full members of the RAS for the given department, are regarded as the elected candidates for full members of the RAS.

The people, who received the largest number of votes (with allowance made for voting by rounds), but not less than two-thirds of the votes of the members of the RAS for the given department, who took part in the voting, and not less than one-half of the registered complement of members of the RAS for the given department, are regarded as the elected candidates for corresponding members of the RAS.

20. At the general meeting of the Russian Academy of Sciences full members of the RAS have the right to vote during the election of full members of the RAS, while full members and corresponding members of the RAS have the right to vote during the election of corresponding members of the RAS.

The voting procedure remains the same as during the election of candidates for full members and corresponding members of the RAS at the general meetings of the departments.

21. The election of foreign members of the Russian Academy of Sciences to the vacancies, which have been opened by the presidium of the RAS, is conducted in accordance with the procedure that is envisaged for corresponding members of the RAS.

IV. The Duties and Rights of Members of the Russian Academy of Sciences

22. The main duty of members of the Russian Academy of Sciences is to enrich science with new achievements.

23. Each member of the Russian Academy of Sciences is a member of one of the departments. Full members and corresponding members of the RAS can transfer to another department; the voting procedure in case of the transfer to another department remains the same as during the election of candidates for full members and corresponding members, respectively.

The members of the RAS, who belong to one department, can with the consent of the majority of members of another department, which has been expressed by secret ballot, take part in its work and exercise all the rights of a member of this department, with the exception of the right to vote during the election of candidates for members of the RAS, the academician secretary, and the bureau of the department.

24. The members of the Russian Academy of Sciences are obliged to take part in the work of the general meeting of the RAS and the general meeting of the department, to which they belong.

The members of the Russian Academy of Sciences have the right to submit for consideration by the presidium of the RAS and the bureau of the department, to which they belong, scientific and scientific organizational questions, as well as through the presidium of the RAS and the bureaus of the departments to submit these questions for discussion by the general meeting of the RAS and the general meeting of the department.

V. The General Meeting of the Russian Academy of Sciences

25. The general meeting of the RAS, which consists of the full members and corresponding members of the RAS, as well as the scientific associates, who have been delegated for a term of one to five years by scientific institutions of the RAS (with the rights of an institute) in accordance with the quotas that are established by the general meeting of the RAS, is the highest organ of the Russian Academy of Sciences.

The scientific associates, who are sent as delegates by scientific institutions of the RAS to the general meeting of the RAS, are elected by the scientific councils of these institutions by secret ballot.

26. The general meeting of the RAS adopts the charter and approves the statutory documents of the RAS (the Statute on the Legal Regime of the Property of the RAS, the Statute on the Department, the charters of the regional departments, the Basic Principles of the Organization and Activity of the Scientific Research Institute of the RAS); approves the accountability reports of the presidium of the RAS; approves the annual report on the fulfillment of the plan of base budget financing of the academy and specifies the directions and priorities of the formation of the plan for the next fiscal year; hears the reports of the departments, regional departments, and regional scientific centers, institutions of the RAS, and individual scientists; discusses scientific and scientific organizational problems; elects full members and corresponding members of the RAS, foreign members, and the presidium of the RAS.

27. The general meeting of the Russian Academy of Sciences is convened as needed, but not less often than once a year. The annual general meeting of the RAS is held in March.

Questions for discussion at the general meeting of the RAS can be submitted through the presidium of the RAS by the members of the general meeting and by decisions of the scientific institutions and departments of the RAS and the conferences of scientific associates of the RAS.

28. At the general meeting of the RAS all its members have the right to vote (with the exception of the cases stipulated by Articles 20 and 21 of this charter).

29. The general meeting of the RAS is authorized to adopt decisions, if a simple majority of the members of the meeting are present at it; decisions are adopted by a majority vote (with the exception of the cases stipulated by Articles 20, 21, 31, and 58 of this charter).

All personnel questions are decided by the general meeting of the RAS by secret ballot.

VI. The Presidium of the Russian Academy of Sciences

30. The presidium of the Russian Academy of Sciences is made up of the president, vice presidents, and chief

scientific secretary of the RAS, the academician secretaries of the departments, the chairmen of the regional departments, and the members of the presidium. The number of vice presidents and members of the presidium is specified by the general meeting of the RAS.

The president, vice presidents, and chief scientific secretary of the RAS are elected by the general meeting of the academy from among the full members of the RAS.

The vice presidents and chief scientific secretary of the RAS are elected by the general meeting of the RAS on the representation of the president of the RAS.

The academician secretaries of the departments and the chairmen of the regional departments of the RAS are elected by the general meetings of the corresponding departments. The academician secretaries of the departments are approved as members of the presidium by the general meeting of the RAS. The chairmen of the Far Eastern, Siberian, and Ural Departments and the chairman of the St. Petersburg Scientific Center on the representation of the president of the RAS are approved by the general meeting of the academy as vice presidents of the RAS.

The members of the presidium are elected by the general meeting of the RAS from among the members of the general meeting of the RAS.

The formation of the entire membership of the presidium is carried out simultaneously, for a term of five years.

For election to the presidium it is necessary to receive a majority of the votes of the members of the general meeting of the RAS, who took part in the voting.

The allocation of duties among the president, vice presidents, and chief scientific secretary of the RAS and the other members of the presidium is established by the presidium of the RAS.

When standing for reelection the presidium submits to the general meeting of the RAS a report on its activity during the past five-year period.

31. The presidium implements the decisions of the general meeting of the RAS and during the period between sessions of the general meeting supervises all the activity of the academy.

In all its activity the presidium is accountable to the general meeting of the academy. The presidium reports to the general meeting on the most important decisions which were made by it during the period between sessions of the general meeting.

The general meeting of the RAS can dismiss ahead of time the entire membership of the presidium of the RAS (or individual members of it) and hold an election of a new membership of the presidium (elect new members in place of the recalled members) for the remaining term until the next election of the presidium. The decision on

the early dismissal of the members of the presidium is made by a two-thirds majority vote of the members of the general meeting, who are present at it.

32. The presidium of the Russian Academy of Sciences: convenes the sessions of the general meeting of the RAS;

on the representation of the corresponding departments establishes scientific research and auxiliary scientific institutions and enterprises, which are necessary for the accomplishment by the academy of its tasks; specifies the directions of work and the specialization of scientific research institutions of the RAS, which are being newly established;

on the representation of the corresponding departments makes a decision on the change of the specialization or the elimination of scientific research and auxiliary scientific institutions and enterprises;

organizes scientific councils for the most important complex problems of basic research, as well as committees and commissions;

takes the necessary steps for the use of the results of scientific research work for the purposes of the economic, social, and cultural development of Russia;

advances a legislative initiative on the drafting of laws on science and state acts, which concern state scientific and technical policy;

convenes scientific congresses, conferences, and meetings, organizes research expeditions;

organizes work on the training of scientific personnel and the advanced training of scientific associates of the RAS;

approves the advisers of the Russian Academy of Sciences;

supervises the publishing activity of the RAS; on the representation of the Scientific Publishing Council approves the plans of publications of the RAS, monitors their fulfillment, allocates the assets that are necessary for the publishing activity of the RAS; on the representation of the corresponding departments approves the editors in chief of academic scientific journals; makes decisions on the establishment, reorganization, or elimination of academic journals;

plans the international ties of the RAS, implements the scientific ties of the academy with the academies of sciences and other scientific institutions of foreign countries;

awards for outstanding scientific works, discoveries, and inventions goals medals and prizes named after prominent scientists;

presents to the general meeting of the RAS annual reports on the activity of the academy.

33. The presidium of the RAS approves the annual plan of base budget financing of the academy, in which it

envisages the distribution of the indicated assets among the departments of the RAS and the directions of centralized expenditures of the academy; annually delivers to the general meeting of the RAS a report on the fulfillment of the plan of financing, on the basis of which the meeting makes a decision on the directions and priorities of the formation of the plan for the next fiscal year; can establish in accordance with a decision of the general meeting of the RAS special funds and reserves for the special-purpose financing of the most promising directions of basic research.

34. The distribution of budget assets takes place openly and publicly. The budget of the RAS and the report on its fulfillment are published in the journal VESTNIK ROSSIYSKOY AKADEMII NAUK.

35. Under the presidium of the RAS there can be scientific research institutes, temporary special-purpose collectives, interdisciplinary problem groups, libraries, archives, publishing organizations with printing and book trade enterprises, houses of scientists, permanent exhibitions, councils, committees, commissions, journals, and other scientific, scientific and technical, and auxiliary scientific institutions, organizations, and enterprises, which support the activity of the academy.

The presidium of the RAS elects the directors of scientific research institutes and appoints the managers of auxiliary scientific and other institutions, the chairmen of councils, committees, and commissions, and the editors in chief of journals, which are under the presidium of the RAS.

36. The presidium of the RAS monitors the observance of the charter of the RAS by all the members of the academy, its institutions, and officials.

37. The presidium of the RAS has an office staff, which functions on the basis of the statutes on its structural parts, which are approved by the presidium of the RAS.

VII. The Departments of the Russian Academy of Sciences

38. The department of the Russian Academy of Sciences unites the members of the academy, who have been elected for the given department, and the scientific associates of the institutes and other scientific and auxiliary scientific institutions of the academy, which are a part of the given department.

The department of the Russian Academy of Sciences is the basic scientific and scientific organizational center, which unites in the Russian Academy of Sciences scientists of one or several fields of science.

The department has within it scientific centers, institutes, and other scientific and auxiliary scientific institutions. Under the department there can be scientific

councils, committees, and commissions and scientific societies; the department publishes journals in its specialization.

On the petition of sectorial scientific institutions and higher educational institutions the department can assume the scientific methods supervision of these institutions. The decision on the scientific methods supervision of institutions, which do not belong to the RAS, is made by the general meeting of the department on the representation of the bureau of the department.

The departments can establish associations from among scientific institutions that are and are not a part of it.

The department formulates the basic directions of basic research in the corresponding fields of science, carries out its coordination at scientific institutions of the department, makes an analysis and forecast of the state and development of domestic and world science, supervises the activity of the scientific councils, committees, commissions, and societies, which are under the department, promotes the strengthening and development of the material and scientific base of institutes and ties with scientific institutions and scientists of various departments and higher educational institutions, and develops international scientific cooperation.

39. The general meeting of the department, which consists of the members of the RAS, as well as the scientific associates, who were sent as delegates by scientific institutions of the department to the general meeting of the RAS in accordance with Article 25 of this charter, is the highest organ of the department.

At the general meeting of the department all its members have the right to vote with the exception of the cases envisaged by Articles 17 and 23 of this edict.

The scientific associates, who have been sent as delegates to the general meeting of the RAS by scientific institutions of the regional departments, which correspond to the specialization of the department, can take part in the work of the general meeting of the department without the right to vote.

The general meeting of the department is authorized to adopt decisions, if a simple majority of the members of the meeting are present at the session; questions are decided by a majority vote with the exception of the cases stipulated by Articles 17, 19, and 23 of this charter.

40. The bureau of the department, which is headed by the academician secretary of the department, supervises the work of the department during the period between sessions of the general meeting of the department.

The academician secretary of the department is elected by the general meeting of the department from among the full members of the RAS and is approved by the general meeting of the RAS.

The deputy academician secretaries and the members of the bureau are elected by the general meeting of the

department from among the members of the general meeting and are approved by the presidium of the RAS.

The election of the entire membership of the bureau of the department is conducted simultaneously, for a term of five years, by secret ballot.

In all its activity the bureau of the department is accountable to the general meeting of the department. The bureau reports to the general meeting of the department on the most important decisions which were made by it during the period between sessions of the general meeting of the department.

When standing for reelection the bureau of the department submits to the general meeting of the department a report on its activity during the past five-year period.

41. The academician secretary of the department is the speaker at the meetings of the presidium of the RAS on questions, which have been assigned to the jurisdiction of the department, chairs the general meeting of the department, and in his actions is accountable to the general meeting of the department and the presidium of the RAS.

42. The functions and powers of the general meeting and bureau of the department are specified by the Statute on the Department of the Russian Academy of Sciences, which is approved by the general meeting of the RAS. The charters of each department with allowance for the specific peculiarities of its activity, which are approved by the presidium of the RAS, can be drafted on the basis of this statute.

VIII. The Regional Departments of the Russian Academy of Sciences

43. The regional department of the Russian Academy of Sciences unites the members of the RAS, who work in the given region, and the scientific associates of the institutes and other scientific and auxiliary scientific institutions of the academy, which are located in this region.

The regional department has within it institutes and other scientific and auxiliary scientific institutions; it can have within it regional scientific centers.

The decision on the organization of a regional department is made by the general meeting of the RAS on the representation of the presidium of the RAS. The decision on the organization of new scientific institutions within the regional department is made by the presidium of the RAS on the representation of the given regional department.

44. The development of research, which is aimed at the solution of the most important scientific problems, as well as the accomplishment of tasks, which contribute to the successful development of the given region and the Russian Federation as a whole, is the basic task of the regional department.

45. The highest organ of the regional department of the Russian Academy of Sciences is the general meeting of this department, the full complement of which is specified by the

charter of the regional department. Here all the members of the RAS for the given department and the scientific associates, who have been sent as delegates by institutions of the given department to the general meeting of the RAS in accordance with Article 25 of this charter, should be members of the general meeting of the regional department.

46. The scientific research work of the institutions of the regional department is coordinated by the departments of the RAS, which corresponds to their specialization.

During the election of full members and corresponding members of the RAS the presidiums of the regional departments come to an agreement with the bureaus of the departments on the breakdown by specialties of the vacancies that have been envisaged for them.

47. The presidium of the regional department is the governing body of the regional department during the period between sessions of the general meeting of the department.

The presidium of the regional department is made up of the chairman of the department, the deputy chairmen, the chief scientific secretary of the department, and the members of the presidium of the regional department.

The chairman of the regional department is elected by the general meeting of the given department from among the full members of the RAS.

The deputy chairmen, the chief scientific secretary, and the members of the presidium are elected by the general meeting of the regional department from among the members of the general meeting of this department and are approved by the presidium of the RAS.

The election of the entire membership of the presidium of the regional department is conducted simultaneously, for a term of five years, by secret ballot.

In all its activity the presidium of the regional department is accountable to the general meeting of the department. The presidium reports to the general meeting of the department on the most important decisions which were made by it during the period between sessions of the general meeting of the regional department.

When standing for reelection the presidium submits to the general meeting of the regional department a report on its activity during the past five-year period.

48. The functions and powers of the general meeting and presidium of the regional department are specified by the charter of the given department. The charters of the regional departments are approved by the general meeting of the RAS.

IX. The Regional Scientific Centers of the Russian Academy of Sciences

49. The regional scientific centers of the RAS are associations of institutes and other scientific and auxiliary

scientific institutions of the RAS in regions, the comprehensive development of which is of great economic and social importance.

The decision on the organization of a regional scientific center of the RAS is made by the presidium of the RAS with subsequent approval by the general meeting of the RAS.

50. The composition, procedure of election, functions, and powers of the general meeting and presidium of the regional scientific center of the RAS are specified by the charter of the center. Here all the members of the RAS, who work at the institutions, which are united by the given center, and at other institutions of the region, and the scientific associates, who have been sent as delegates by institutions of the given center to the general meeting of the RAS in accordance with Article 25 of this charter, should be members of the general meeting of the center.

X. The St. Petersburg Scientific Center

51. The St. Petersburg Scientific Center unites the members of the RAS, who work in St. Petersburg and the oblast, and the scientific associates of the institutions of the RAS, which are located in this region.

The St. Petersburg Scientific Center has within it institutes, other scientific and auxiliary scientific institutions, as well as institutions of the social sphere.

The scientific, scientific methods, and scientific organizational supervision of the scientific institutions of the center, which belong to departments of the RAS, is carried out by these departments.

52. The basic tasks of the center are: the development of research under interdisciplinary regional programs, which are being fulfilled by institutions of the center, the aiding of the conducting of research that has been assigned to institutions of the center by departments of the RAS, the coordination of the cooperation of academic institutions with sectorial scientific research institutes and higher educational institutions of the region. The charter of the regional scientific center of the RAS is approved by the presidium of the RAS.

XI. The Scientific Research Institute of the Russian Academy of Sciences

53. The basic structural unit of the scientific research activity of the Russian Academy of Sciences is the institute, the main goal of which consists in the conducting of basic research.

For the accomplishment of its goals the institute independently solves economic, social, and organizational problems.

The institute can be a part of a department, a regional department, a regional scientific center of the RAS or be under the presidium of the RAS.

54. The director of the institute heads the institute of the RAS. The director of the institute is elected at the general

meeting of the corresponding department (regional department) or at a joint session of the general meetings of several departments by secret ballot for a term of five years from among the candidates who were supported by the scientific collective of the institute.

55. The institute of the Russian Academy of Sciences operates on the basis of its own charter, which was drafted in accordance with the Basic Principles of the Organization and Activity of the Scientific Research Institute of the RAS, which are approved by the general meeting of the RAS. The charter of the institute is approved by the bureau of the department or the presidium of the regional department, of which it is a part. The charter of the institute that is under the presidium of the RAS is approved by the presidium of the RAS. The functions and powers of the director of the institute and the scientific council of the institute, as well as the duties and rights of the scientific associates of the institute are specified by the charter of the institute.

XII. The Special Rights of the Russian Academy of Sciences

56. The Russian Academy of Sciences stores the manuscripts of scientists and figures of literature, culture, and art, as well as the archival materials of institutions of the RAS and other materials, which are of historical value, in the Archive of the RAS and the archives of scientific institutions of the academy and at the library of the academy, without turning them over to statewide archival depositories.

57. The general meeting of the RAS, the presidium of the RAS, the departments, regional departments, and regional scientific centers of the RAS, scientific research institutes and scientific institutions of the RAS that are equated with them have seals with a picture of the State Emblem of the Russian Federation and with the specification of the name of the corresponding institution.

XIII. The Procedure of the Amendment of the Charter of the Russian Academy of Sciences

58. The amendment of the charter of the Russian Academy of Sciences is carried out in accordance with a decision of the general meeting of the RAS, which has been adopted by not less than a two-thirds majority vote of the members of the general meeting of the RAS, who are present at the meeting; here a majority of the votes from the registered complement of members of the RAS and a majority of the votes from the registered complement of full members of the RAS are necessary.

Appendix to the Charter of the Russian Academy of Sciences

The Departments of the RAS for Fields and Directions of Science:

- 1) Mathematics Department;
- 2) General Physics and Astronomy Department;
- 3) Nuclear Physics Department;
- 4) Physical and Technical Problems of Power Engineering Department;

5) Problems of Machine Building, Mechanics, and Control Processes Department;

6) Information Science, Computer Technology, and Automation Department;

7) General and Technical Chemistry Department;

8) Physical Chemistry and Technology of Inorganic Materials Department;

9) Biochemistry, Biophysics, and Chemistry of Physiologically Active Compounds Department;

10) Physiology Department;

11) General Biology Department;

12) Geology, Geophysics, Geochemistry, and Mining Sciences Department;

13) Oceanology, Atmospheric Physics, and Geography Department;

14) History Department;

15) Philosophy, Sociology, Psychology, and Law Department;

16) Economics Department;

17) Problems of World Economics and International Relations Department;

18) Literature and Language Department.

The Regional Departments of the RAS:

- 1) Far Eastern Department, including the scientific centers of the department;
- 2) Siberian Department, including the scientific centers of the department;
- 3) Ural Department, including the scientific centers of the department.

The Regional Scientific Centers of the RAS:

- 1) Dagestan Scientific Center;
- 2) Kazan Scientific Center;
- 3) Karelian Scientific Center;
- 4) Kola Scientific Center;
- 5) Noginsk Scientific Center;
- 6) Pushchino Scientific Center;
- 7) Samara Scientific Center;
- 8) St. Petersburg Scientific Center;
- 9) Saratov Scientific Center;
- 10) Troitsk Scientific Center;
- 11) Ufa Scientific Center.

Russian Security Forces Block Departure of Missile Experts

937A0108A Moscow *RABOCHAYA TRIBUNA*
in Russian 11 Feb 93 p 3

[Article by RABOCHAYA TRIBUNA correspondent Mikhail Popov under the rubric "Sensations From the Provinces": "'Secret Bearers' on Suitcases. How One Clever Man Recruited a Group of Missile Experts for Work in North Korea and Why Their 'Quiet Departure' Abroad Did Not Take Place"—first paragraph is RABOCHAYA TRIBUNA introduction]

[Text] Chelyabinsk—They call them "secret bearers." For long years they worked at closed enterprises, developing the nuclear missile shield of the homeland. Now the concept of the security of the country has changed fundamentally, military orders have declined. And the most exceptional intellectuals, who in addition have hands of gold, suddenly felt unnecessary to the homeland, which had never happened to them before. And what an insignificant amount of money they pay now for "the bearing of secrets." But what if someone were to offer for knowledge a manifold greater price? Would the "brains" of defense workers not start to flow abroad, to where the best specialists of other sectors beat a track long ago?

Recently federal security bodies of Russia prevented the attempt at the self-departure of "secret bearers" directly at the Sheremetyevo International Airport, before the very boarding of the airplane. A large group of specialists, of which workers of the Miass Design Bureau of Machine Building constituted the core, was attempting to leave for wages in North Korea. How were things going?

Exactly a year ago, in February 1992, one Anatoliy Rubtsov showed up in Miass and entered into talks with the management of the design bureau, which is one of the leading centers of domestic missile building. It was easy to do this, inasmuch as, according to the data of security bodies, Rubtsov had earlier studied at a higher educational institution with several of its workers. The discussion concerned the possibility of the participation of staff members of the design bureau in work abroad, particularly in Southeast Asia. Specific countries—China, the DPRK—were also named. Here Rubtsov introduced himself as a man, who had been given powers in this matter, which he had received simultaneously from several governments, including the Russian government.

The design bureau at that time was experiencing a sharp decrease of the volume of orders, and the proposal of Rubtsov fell on fertile soil. A few more meetings in Miass and Moscow, and a group of engineering and technical personnel, who had dealt with the problems of strategic missile weapons, "grew ripe" for the flight abroad.

But to start with they decided to conduct reconnaissance. Ten specialists took off for North Korea, moreover, no one even asked the question of their possession of state

secrets. They took advantage of the open confusion in the official registration of foreign departures and resorted to the services of private commercial structures, which had been given a license for the right to draw up foreign passports, and—how do you do, Pyongyang.

There was an objective discussion there: What interests the Korean side, on what problems of missile building the Russian scientists are to work. The Korean side assumed all the moving expenses, inviting people to work at a state enterprise, staff members of the embassy of the DPRK in Moscow were put to work. Everything testified that the situation was under the control of the two states. But the main misconception of the scientists also lay in this. Whereas the Korean side actually was interested in carrying out this action—by means of the Russian potential to carry out in a short time the modernization of its missile weapons—the government of Russia simply could not give its consent to this project. The Treaty on the Nonproliferation of Strategic Weapons imposes rather specific obligations on our country.

Thus, they promised our specialists from \$1,500 to almost \$4,000 a month. After this the missile builders returned to Miass and began the actual preparation for departure abroad. In passing they enlisted on their side other specialists who were involved with the production of strategic weapons. In the end the composition of the group exceeded 60 people. Moreover, not all of them worked at the Miass design bureau. There were also staff members of other closed enterprises, from other regions, and even from neighboring foreign countries. Valeriy Mikhaylovich Tretyakov, chief of the security administration of the Russian Federation for Chelyabinsk Oblast, is reserved:

"I do not presume to comment. But you yourself understand that strategic missile weapons are not intended to carry some 50-kilogram warheads. Of course, they prepared it for specific types of weapons, once against strategic ones."

But they were not allowed to take off.... As a result two high-ranking diplomats from the embassy of the DPRK were forced in 24 hours to pack their "attache cases."

Now the missile builders are again in the Urals.

Alas, the moral harm, which they suffered, is very great. But their sad experience is a lesson for others. Those who at one time also gave a written undertaking not to divulge secrets. The state, which entrusted a secret to a person, cannot allow him to dispose of it at his own discretion. While an entire system exists so that secrets would not "float away." The federal security bodies this time proved that they are eating bread not without reason.

Problems With Russian ITER Participation

937A0117A Moscow NAUKA I BIZNES in Russian
2 Apr 93 p 11

[Article by Sergey Stepanenko: "It's Not Likely That Russia Will Leave the ITER Project"; first paragraph is source introduction]

[Text] The emblem on the first unit for the study of nuclear fusion is the Sun on the palm of a hand. These days, one could leave the Sun (it's not forbidden to dream), but the palm needs to be extended into an outstretched arm: there's no money to continue the work.

The first cavalry attacks—when it seemed that it was enough to just twist a "couple more nuts," and a sea of energy (from an ocean of energy) would jump from the palm of our hand into our pocket—did not justify our hopes, but the search didn't stop. Scientists switched to a lengthy siege of the nuclear fusion, and after I. V. Kurchatov's sensational report, it was decided in Kharuel to do it together, with the rest of the world. First, an international Tokamak was proposed; then it became INTOR; and now, in the stage of design development, it is ITER. The executors of the project are the United States, Russia, Japan, and Euroatom, and the work is under way at four sites.

A partnership, of course, presupposes a specific financial contribution by each participant. With the confusion that exists with our budget, Russia isn't investing any money. That brings up an anecdote: the director of the San Diego site (U.S.)—by agreement, the site manager must be a scientist from another country—is V. Chuyanov, who has been living in America with his family since October of last year, receiving just \$25 per diem. The Americans cannot conclude a contract with him, because our country is supposed to pay the defrayal costs of the contract.

At the Russian site, before the end of the year, \$50 million worth of work is supposed to be done, and as of today, there's not even a hint that the obligations will be fulfilled.

As our specialists explain, people sympathize with Russia, and none of the partners in the project is striking any pose yet. Although the director of the entire project, a Frenchman by the name of Rebieux [Rebyu] (who, they say, is a rather strict man), did go personally to B. N. Yeltsin about that. Rebieux feels that if, by the end of April, Russia does not fulfill obligations of the agreement, the question may be raised at the next meeting of the ITER council in Tokyo of whether to oust Russia from the joint project. Right now, the technical and administrative committees of ITER are discussing those issues in Munich.

But, our ITER sufferers say, there's another side to the coin: the partners are not interested in Russia leaving the joint project. That would trip up their own programs, because a joint project of such a scale has not played the

last international card. If Russia were not to participate, it's possible that the financing for the other national fusion programs would be cut back.

It would seem that, earning \$600 million a year, the Ministry of Nuclear Energy could release 50 million for such prestigious work. But the fact is that the leadership of the main research areas of the ministry sees the fusion matters as a burden. Although the Ministry of Nuclear Energy argued about the budget request for money for ITER made by the Ministry of Science and submitted its own request in recent days.

Physics research in the fusion program is also suffering without money. Tokamak-15, a longtime candidate for the scientific pride of the country, is waiting for the start of the experimental program. But facing the scientists of the Russian Science Center Kurchatov Institute is Hamlet's "to be or not to be." For the experiments on the superconducting winding of the apparatus to be conducted, things have to be cooled down, and nitrogen and helium are needed. For the unit to be in operating mode for 24 hours costs 20 million rubles. When you consider that the experiments are designed to last two months, it's not hard to figure out how much that curiosity, as Academician Artsimovich has called it, will cost the state. In addition, money is required up front, and if you do only half of the experiments outlined, you lose the money and you get no results.

Osipov Publicly Supports Yeltsin Over Impeachment Attempt

937A0117B Moscow NAUKA I BIZNES in Russian
2 Apr 93 p 9

[Article by Vladimir Pokrovskiy: "Deserved Applause"; first paragraph is source introduction]

[Text] As you know, at the last General Assembly of the Russian Academy of Sciences, President Yuriy Osipov, to the applause of those gathered, expressed his clear support of Russian president Boris Yeltsin. Unfortunately, we didn't have time to place the information about that in this issue of NAUKA I BIZNES, so we sent it to DELOVOY MIR. However, we would also like to join in on the applause.

Our enthusiasm may seem strange—after all, in theory, it's just the normal behavior of a normal person, which, in any case, is what we have regarded Yuriy Osipov. But the fact of the matter is that in recent years, the Academy higher-ups have not indulged us too much with such behavior.

In fact, we are accustomed to the situation of the Ilf and Petrov critic Gav. Tsepnoy, who does only what attacks the Academy. We criticized it for this and for that, since there was more than enough material in the Academy for criticism. And to our great chagrin, we are not only not accustomed to actions like the one we're talking about here, but have even constantly encountered behavior that has been the total opposite. Like the failure of the

Academy of Sciences's presidium to nominate Andrey Sakharov in 1989 as a USSR people's deputy candidate. Or the shameful silence of the Academy leadership in August 1991. And even in the postcommunist period, we constantly encountered episodes that, had they been placed in a row with a collection of hits from the life of the 19th congress, would not have spoiled the overall picture much.

In reply, we heard unflattering comments about us. True, no names or addresses were mentioned: the impersonal adjective "some" was used, but it was clear that we were right in there among the extremists who absolutely want to "destroy the Academy." That assertion is not true. We simply have a different idea about how the Academy should be.

In fact, neither the authors of these lines nor, I think, his colleagues experience any particular joy from any of the bad language. It's more pleasant to just be reporting specific useful information about, for example, the various philanthropic funds or other such funds. But we feel that we can't behave in any other way.

And that's exactly why we decided to place special emphasis on our most sincere congratulations to Yuriy Osipov and the members of the Academy and on his address to supporters, as well as to express our solidarity with them. In fact, living deep in our soul has always been the notion of the academician as a figure characterized by high morals and even charisma (whatever that silly word means), and under the black Academy hat, we subconsciously dreamed of seeing a white toga. Which virtually never happened on high Academy Olympus. And now it has! Our congratulations.

Yeltsin Letter to Scientists Seeking, Offering Support

937A0119A Moscow *NAUKA I BIZNES* in Russian
7 May 93 p 9

[Appeal of Russian Federation President B. Yeltsin of 22 April 1993: "The Appeal of the Russian Federation President to the Scientific Community"]

[Text] The state and the prospects of the development of domestic science worry me considerably.

Scientists were some of the first people, who behind the smoke screen of demagoguery and the penchant for hare-brained schemes recognized the criminal essence of Bolshevism and understood the historical hopelessness of the means of development, which had been imposed on society. Scientists were in the front ranks of the people who even during the worst times boldly raised their voice in defense of freedom and democracy.

I know that many, many workers of intellectual labor are having a hard time. A large number of completely new, unfamiliar problems have appeared. There are weariness

and irritation. But all the same I believe that the scientific intelligentsia of Russia will never sacrifice the professional emancipation that is now being acquired.

I am far from justifying the miscalculations that were made during the economic reform with respect to science. Unfortunately, there were many of them, but they are all correctable. It is all the more important now to change radically the policy of the self-survival of science, which has just begun to gain a foothold. It is thoroughly wrong. The slogan "the rescue of drowning people is the drowning people's own job" is categorically inapplicable here. The applied sciences will find application more quickly and easily under the conditions of a market economy. The fate of basic science—the special pride of Russia and the basis of all our progress—worries me significantly more.

The Russian Academy of Sciences and the sectorial academies are a unique system of the organization of scientific research in the statewide structure of science. It should be preserved and strengthened. I do not see a reasonable alternative to the principles of self-administration in its development and vital activity.

At the same time it is necessary to change radically the system and the structure of the financing of the scientific sphere. First of all it is a matter of the stability of the budget financing of basic science. Steps are being taken on the transfer to the academies of sciences of the necessary parcels of land, a portion of the foreign exchange earnings, and additional buildings and structures. The government on my instructions is preparing a program of the social support of scientists.

One of the most serious, chronic problems, which is striking a painful blow to basic science, society, and the state, is the failure of our economy and the structures of state power to claim scientific developments. Scientists have something to offer. But many developments as before lie waste.

Earlier the inertness of the planned economy was the reason. Today it is the economic crisis and the tremendous inertia of the Russian bureaucratic machine. I am confident that market relations and the establishment of democracy will make it possible to ensure an increase of the interest in scientific research and a demand for its results.

Thus far we do not have an effective mechanism of the transfer of new ideas and knowledge to the sphere of state administration. The development of such a mechanism is considered a task of state importance. Your activity in this direction will receive the support of the president.

The president and the government intend to advance soon a number of large-scale, national programs of the development of Russia. Among them are the development of power engineering and power supply, microelectronics and computer technology, communications systems, and biotechnologies, space research, and the

development of new materials and technologies. Support will be given to agrarian science and all sections of the basic natural sciences and humanities.

All our undertakings will be able to be carried out on one condition—the continuation of changes. The fate of the reforms and the fate of Russia are in the hands of the people.

I appeal to the entire creative intelligentsia of Russia to support by its vote the reforms that we are implementing. They are the path of a democratic, civilized, and flourishing country, to a rule-of-law state, in which the protection of rights and freedoms, including the right to free scientific creativity, is guaranteed.

No matter what difficulties surround us today, I am convinced that Russia will find the strength within itself and will get itself out of the quagmire. We simply have no other choice!

Lavrentyev Work on Thermonuclear Fusion Described

937A0123A Moscow NEZAVISIMAYA GAZETA
in Russian 1 Jun 93 pp 1, 6

[Article by Marina Kuryachaya under the rubric "Archives": "Controlled Thermonuclear Fusion: Who Is First? Only Academician Sakharov Knew the Entire Truth"]

[Text] Eureka!

In 1948 Oleg Lavrentyev guessed how to make a hydrogen bomb. At that time he was 22 years old, while behind him were seven grades of secondary school and the war, for which Oleg left as a volunteer, and now there was active service on Sakhalin Island. He changed his occupation from a frontline scout and observer to a radiotelegraph operator and continued what the war had interfered with—training for scientific work.

The schedule of the daily routine was packed to the limit. But then in May 1949 Oleg held a secondary school graduation certificate—in a year he had completed the eighth, ninth, and 10th grades of evening school with almost all A's. It was impossible to expect otherwise from the man who was giving officers lectures on technical novelties.

To this day Oleg Aleksandrovich remembers these lectures with gratitude. The command gave him several days for their preparation. Books, journals, textbooks, and, what is the main thing, the opportunity to think were at his disposal. In the quiet of the army library what Oleg had racked his brains over for more than a year suddenly became clear and simple. He had finally found a substance, which is capable of detonating under the action of a nuclear explosion and of increasing by many fold the energy being released. Thus arose the idea of

using lithium-6 deuterium. He sketched the first diagram, without suspecting that two years later American scientists would arrive at the same idea.

The interaction of light elements occurred with the release of enormous energy. But what if one were to use thermonuclear fusion for industrial purposes? Here it was a matter of plasma. Of course, no material will withstand such a degree of heat. Plasma, it turns out, should not come into contact with the walls of the vessel. Calculating different versions, Lavrentyev finally found the key to the solution. He found how to subdue plasma. A field! That is the main thing!

In the first version Oleg chose an electric field. He contemplated making the electrostatic reactor for the accomplishment of controlled thermonuclear fusion in the form of a multielectrode system of spherical concentric grids. Now he devoted all his free time to the new idea.

Letters to Stalin and the Party Leadership

Once he did not restrain himself. The letter to Stalin was short, just a few lines. Oleg wrote that he knew the secret of the hydrogen bomb. It was January 1950.... A month, another month, a third month passed. There was no reply. And then Lavrentyev sent the same kind of letter to the Central Committee of the All-Union Communist Party (of Bolsheviks). The reaction was quick as lightning.

From the Unpublished Memoirs of O.A. Lavrentyev

"As soon as the letter reached the addressee, they called the Sakhalinskaya Obkom from Moscow, and Lieutenant Colonel of Engineer Service Yurganov came to me from Yuzhno-Sakhalinsk. As far as I understood, his task was to convince himself of whether I was a normal person with a normal mentality. I spoke with him on general themes, without revealing specific secrets, and he left satisfied.

"While a few days later the unit command received an order to create for me the conditions for work. At the unit headquarters they allotted me a guarded room, and I got the opportunity to write my first work on thermonuclear fusion."

To Moscow

Before this for reasons of secrecy Lavrentyev did not allow himself notes, keeping in memory all the details of the calculations. But now they carefully retyped his work—true, in a single copy—and sent it by secret mail to the Central Committee of the All-Union Communist Party (of Bolsheviks), to I.S. Serbin, chief of the heavy machine building department. They burned all the rough drafts before his eyes, about which they drew up an official act.

In the evening of 22 July 1950 the demobilized sergeant got on a train. He got to Moscow only on 8 August. After

passing all the examinations, Oleg got through the competition successfully and was admitted to the physics faculty of Moscow State University.

A month later Lavrentyev wrote another work on thermonuclear fusion and through the dispatch office of the Central Committee delivered it to Serbin. The response was silence.

The winter of 1951 began. That day, 3 January, Oleg returned late to the dormitory—he had taken an examination.

From the Unpublished Memoirs of O.A. Lavrentyev

"I got to the room, and they told me that they had been looking for me, a telephone number, which I should call when I arrived, was left. I called, the subscriber at the other end of the line introduced himself—Minister of Measuring Instrument Making (such was the code name of the Ministry of the Atomic Industry—M.K.) Makhnev. He invited me to come to him right then. At the pass office, probably because of the late hour, in addition to myself, there was only one other person, and when I received the pass, they gave my name, he looked at me closely and followed. It turned out that we were going in the same direction, to the same address. When we arrived at the reception room, Makhnev came out of his office and introduced us to each other. This was Andrey Dmitriyevich Sakharov."

A Proposal on Collaboration

Thus Oleg made the acquaintance of the reviewer of his first work. Makhnev immediately got down to business, having asked Sakharov to read the second work of Lavrentyev. Retyped carefully by someone, with a diagram done in India ink, it lay on the desk. From the conversation Oleg understood that Andrey Dmitriyevich was familiar for the present only with his previous work and regarded it as very important. But they did not have time to talk straight. They succeeded in doing this only a few days later.

Makhnev again summoned both of them, and again very late. The chairman himself of the Special Committee, Lavrentiy Pavlovich Beriya, set the meeting for them. At that time that is what they called the body which was in charge of the development of atomic and hydrogen weapons. Several members of the Politburo were on it, the others had no lower a rank than minister, Makhnev performed the duties of secretary.

When the gates of the Kremlin had been left behind, it was already going on 0100. Makhnev wanted to take them in his car, but Sakharov and Lavrentyev declined. Both were joyously excited, and they wanted to get a little closer acquainted with each other. That night Oleg heard many good words about his work. Andrey Dmitriyevich proposed to collaborate and they accompanied him to the metro itself.

But soon another meeting took place. Once they came for Lavrentyev in the evening. They sat him in a car and began to drive. The car stopped at a barbed wire gate, farther on a fence with the same kind of "decoration" was visible.

They had been waiting for him a long time. "Department Chief N.I. Pavlov" Lavrentyev had time to read on entering the office and seeing a man in a general's uniform. "Main Directorate Chief B.L. Vannikov" the nameplate on a new door read.

From the Unpublished Memoirs of O.A. Lavrentyev

"There were two people in the office: Vannikov in a general's uniform and a civilian with a broad and thick black beard. Pavlov sat down beside the civilian, while they sat me facing them. During all the time of my service in the army I had not had occasion to see a general even from a distance. Here I was simultaneously in front of two. They did not introduce the civilian to me, and I did not know with whom I was talking."

Clearance for Secret Operations

The civilian asked the questions. Soon Lavrentyev guessed that the first part of the Sakhalin work, which was devoted to the hydrogen bomb, interested those present. And then the recent sergeant became frightened. Who are they, these generals? Who is this mysterious civilian? Does he have the right to tell without sanction from above about the top-secret device? For at the Kremlin they had warned him about nondivulgence. Having completely lost his head, Oleg did not find anything better to do than to report that he had been to see Beriya.

If Oleg had only known! For Igor Vasilyevich Kurchatov himself was sitting in front of him! In the ensuing silence Pavlov mimicked him sarcastically: "He has been to see Beriya." The theme of the conversation changed abruptly, towards the end Kurchatov suggested to Lavrentyev that he complete the university ahead of time.

Lavrentyev scheduled the daily routine, which even before this was quite packed, now by minutes. He simultaneously attended classes of the first and second years, at the same time they attached to him instructors for individual instruction—in English, physics, and mathematics. Complete mutual understanding was found with mathematician Aleksandr Andreyevich Samarskiy. Precisely with him Oleg made calculations of the "magnetic grids," the idea of which had occurred to Lavrentyev back on Sakhalin Island. Only now the electric field operated in combination with a magnetic field. This was a fundamentally important solution, which later gave rise to the idea of an electromagnetic trap. They completed the calculations in March 1951. And at the beginning of May Oleg received clearance for work at LIPAN—the Laboratory of Measuring Instruments of the USSR Academy of Sciences (that is what they called the Institute of Atomic Energy at that time).

A Pleasant Coincidence

They attached him to the group of I.N. Golovin, an assistant of Kurchatov. They escorted Lavrentyev through the laboratories and showed him all the devices. One—in the form of a torus—particularly interested him. They explained to him that the device had been developed after an idea of Sakharov and was intended for the magnetic confinement and thermal insulation of plasma. This was a complete surprise! During the meetings with Lavrentyev Sakharov had not said a word about his own works on controlled thermonuclear fusion, "termoyad," as people would begin to say later. And here, it turned out, he and I.Ye. Tamm had also arrived at the idea of using a field for the confinement of plasma. Only in the prototype of the future tokamak it was a matter not of an electric field, as in the first version of Lavrentyev, but of a magnetic field.

Such a coincidence pleasantly surprised Lavrentyev. But he himself had not told anyone about his proposals on the hydrogen bomb and thermonuclear fusion, as well as about his acquaintance with Sakharov. At Makhnev's office they had sternly warned him that the work had a top-secret classification. Even Lavrentyev himself was completely in the dark with respect to the fate of his first work. Neither the reviewer nor the management uttered a word in response to his timid questions. He learned the truth completely by chance and many years later.

From the Unpublished Memoirs of O.A. Lavrentyev

"...I.N. Golovin formulated the general conclusion that no defects had been found in my model. Unfortunately, this was only a statement of the fact of the suitability of electromagnetic traps for the obtaining and confinement of high-temperature plasma, but recommendations to begin experimental research did not follow. Igor Nikolayevich gave as the reason for this the fact that there was a more simple method of obtaining high-temperature plasma, in which there was already a good reserve and reassuring results had already been obtained. It is necessary not to scatter forces, but to concentrate them on the main direction."

An Abrupt Turn

The conclusion sounded like a verdict. But only not for Lavrentyev. He sat down to the theory and by June 1952 had prepared a new work. In it the electromagnetic trap was described in detail and calculations of the parameters of plasma were cited. To all indications it turned out that Oleg was on the right path.

The new reviewer struck a crushing blow to his hopes. He regarded the density of plasma in the electromagnetic trap to be greatly overstated. And thus thermonuclear fusion is impossible here. Lavrentyev was in despair. Of course, the reviewer had the right to ask questions, but only an experiment could put the final dots on the "i's." But he was denied precisely an experiment—a very inexpensive one!

It is difficult to say how things would have gone further. But the events, which stirred the entire country, also intruded strongly in the life of Lavrentyev. The death of Stalin and the execution of Beriya by shooting had a strange effect on the fate of the unusual student.

To begin with they ceased to admit him to LIPAN. It turned out that the clearance of Lavrentyev for secret work has been eliminated. By whom? It is unknown. Graduation practice and work on the graduation project had drawn near. It was planned to perform it at LIPAN. But without clearance it was out of the question. No one gave an assignment to another place. Early graduation from the university was upset. What is more, at the same time they deprived Oleg of the increased stipend, while they took the money due as tuition.

Lavrentyev all the same graduated from the university and received an honors diploma. And again an obstacle. There was the preliminary understanding that they would hire him at LIPAN. Suddenly it turned out that there were no vacancies. But in Moscow only this institute dealt with thermonuclear fusion. And at that time they invited Oleg to go to Kharkov. There at the Physical Technical Institute of the Ukrainian SSR Academy of Sciences they intended to organize a plasma research department.

Lavrentyev left filled with high hopes. It was April 1956....

"One Soldier From the Far East..."

The first experiments were conducted in complete secret—in a sealed basement which was absolutely unsuited for scientific research. But Lavrentyev proved all the same to be right in that longstanding dispute with the opponents. The obtained parameters of plasma correlated well with his theoretical calculations. Now it was important to report the first results to a wide range of specialists, since the theme had already been declassified.

Alas, he never succeeded in doing this in Russian. And at that time he published articles in Ukrainian in UKRAINSKIY FIZICHESKIY ZHURNAL. Abroad they immediately noticed the original works of the Soviet scientist. The primary thing is that there they followed in his footsteps. Thus, relying on the works of Lavrentyev, well-known American scientist Robert Hersh (future chairman of the Atomic Energy Commission in the United States) proved the possibility of obtaining a record plasma density. Having met Oleg Aleksandrovich at a conference in Novosibirsk, Hersh reached an agreement on the exchange of scientific information.

Success abroad helped recognition at home. At the Kharkov Physical Technical Institute they adopted the Yupiter program for the development of a nuclear reactor based on the electromagnetic trap.

Precisely at that time in one of the books he came across by chance a description of his story. But in the account on the birth of the Soviet program of research on thermonuclear fusion his name was not even mentioned—there was only an incomprehensible phrase about “one soldier from the Far East.” And then there were completely unintelligible words. Perhaps, the very first proposals of Lavrentyev in some way were a bit crude and required modification. But the idea of using a field, as A.D. Sakharov and I.Ye. Tamm, the very authors of the idea of the tokamak, acknowledged, became the starting point for research.

“Try Appealing to Sakharov”

Unfortunately, in the first open publications on thermonuclear fusion the authors did not give a reference to the Sakhalin work of Lavrentyev. They also did not do this subsequently, although according to existing ethics the reviewer should not use the obtained information for personal purposes without the consent of the author prior to its publication.

Each person worries about his honor in different ways. Oleg Aleksandrovich did not write disclaimers—he simply submitted an application for a discovery. In the State Committee they required that he submit the letter, in which he first proposed to use a field for the confinement of plasma. But the necessary document had disappeared! His work was not found in the CPSU Central Committee. No one knew where it had vanished. Finally they informed him that the archives of the 1950's had been destroyed, and together with them, apparently, so had the work of Lavrentyev. “Try appealing to Sakharov,” they advised him in the Central Committee.

What Is Next?

In December 1974 Oleg Aleksandrovich had in his hands a certificate, in which Andrey Dmitriyevich confirmed that Lavrentyev had made his proposals “long before any publications on this problem.” And later I.N. Golovin sent a similar certificate. He briefly set forth the history of the question and wrote that “the letter of Oleg Aleksandrovich Lavrentyev initiated the birth of the Soviet program of research on controlled thermonuclear research.” Put more simply, his words meant that before this in the Soviet Union people had not thought at all about thermonuclear fusion and especially about tokamaks. So 25 years later Lavrentyev finally got a clear answer to all the questions.

The fact that his works as before aroused great interest abroad served as some consolation. They were cited, and the author was invited to the United States, Canada, and other countries. Need it be said that they did not let him go there? But then they allowed him to submit his paper to a conference in New York. A. Kalmykov read the report. He was a friend, an ally, and, by a fortunate coincidence, the immediate superior of Oleg Aleksandrovich. A very clever man and a talented organizer, he was able to convince the leadership and to gain the financing of new work on the development of the large Yupiter-21 device.

Misfortune came suddenly, from where no one expected it. Kalmykov “was run over by an accelerator.” The dose was too large. The disease dealt with him in half a year. Together with his friend the last hopes for the building of the large device disappeared. To start with they invited Lavrentyev to design “something a little smaller.” But subsequently they began gradually to cut back the research program. In 1989 they halted the financing of its theme altogether.

He had completely fulfilled the plans of his distant youth. And although the first work had disappeared in unknown hiding places, the idea itself was not lost, he “reported it to leading scientists.” There is nothing to add here. And is it necessary? Is it not all the same now who was first? Lavrentyev is worried about another thing: How is one to implement the ideas, the embodiment of which was so close?

[Box, p 6]

Certificate

I confirm that in June or July 1950 I reviewed a work of O.A. Lavrentyev. In this work the author advanced a proposal on the use of “controlled” thermonuclear reactions for industrial purposes and offered a specific diagram, which was based on the heat insulation of high-temperature plasma by an electric field. This proposal, which was made long before any publications on this problem and completely independent of other authors, made a strong impression on me for its originality and boldness of thought. I expressed this opinion in an official review. Familiarization with the work of Lavrentyev served as a stimulus which contributed to the speeding up of my joint work with I.Ye. Tamm on the magnetic heat insulation of high-temperature plasma.

24 November 1973

[Signed] A. Sakharov

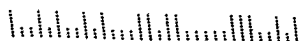
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